SONY

DIGITAL AUDIO RECORDER

PCM-3348HR

DASH PLUS

DIGITAL AUDIO STATIONARY HEAD
DASH

OPERATION MANUAL English

1st Edition (Revised 1)

Serial No. 10001 and Higher

WARNING

To prevent fire or shock hazard, do not expose the unit to rain or moisture.

To avoid electrical shock, do not open the cabinet. Refer servicing to qualified personnel only.

VORSICHT

Um Feuergefahr und die Gefahr eines elektrischen Schlages zu vermeiden, darf das Gerät weder Regen noch Feuchtigkeit ausgesetzt werden.

Um einen elektrischen Schlag zu vermeiden, darf das Gehäuse nicht geöffnet werden. Überlassen Sie Wartungsarbeiten stets nur einem Fachmann.

For the customers in the USA

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

You are cautioned that any changes or modifications not expressly approved in this manual could void your authority to operate this equipment.

The shielded interface cable recommended in this manual must be used with this equipment in order to comply with the limits for a digital device pursuant to Subpart B of Part 15 of FCC Rules.

This symbol is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

For the customers in Europe

This product with the CE marking complies with both the EMC Directive (89/336/EEC) and the Low Voltage Directive (73/23/EEC) issued by the Commission of the European Community.
Compliance with these directives implies conformity to the following European standards:
• EN60950: Product Safety
• EN55103-1: Electromagnetic Interference (Emission)
• EN55103-2: Electromagnetic Susceptibility (Immunity)
This product is intended for use in the following Electromagnetic Environment(s):
E4 (controlled EMC environment, ex. TV studio).

Pour les clients européens

Ce produit portant la marque CE est conforme à la fois à la Directive sur la compatibilité électromagnétique (EMC) (89/336/CEE) et à la Directive sur les basses tensions (73/23/CEE) émises par la Commission de la Communauté Européenne.
La conformité à ces directives implique la conformité aux normes européennes suivantes:
• EN60950: Sécurité des produits
• EN55103-1: Interférences électromagnétiques (émission)
• EN55103-2: Sensibilité électromagnétique (immunité)
Ce produit est prévu pour être utilisé dans les environnements électromagnétiques suivants:
E4 (environnement EMC contrôlé ex. studio de télévision).

Für Kunden in Europa

Dieses Produkt besitzt die CE-Kennzeichnung und erfüllt sowohl die EMV-Direktive (89/336/EEC) der EG-Kommission als auch die Direktive Niederspannung (73/23/EEC).
Die Erfüllung dieser Direktiven bedeutet Konformität für die folgenden Europäischen Normen:
• EN60950: Produktsicherheit
• EN55103-1: Elektromagnetische Interferenz (Emission)
• EN55103-2: Elektromagnetische Empfindlichkeit (Immunität)
Dieses Produkt ist für den Einsatz unter folgenden elektromagnetischen Bedingungen ausgelegt:
E4 (kontrollierter EMV-Bereich, z.B. Fernsehstudio).

Peak inrush current

(1) Power ON, current probe method:
90A: PCM-3348HR, 34A: RM-3348HR (240V)
(2) Hot switching inrush current, measured in accordance with European standard EN55103-1:
7A: PCM-3348HR, 8A: RM-3348HR (230V)

Appel de courant de crête

(1) Mise sous tension (ON), méthode de sondage du courant:
90A: PCM-3348HR, 34A: RM-3348HR (240V)
(2) Mesuré conformément à la norme européenne EN55103-1:
7A: PCM-3348HR, 8A: RM-3348HR (230V)

Spitzenstrom

(1) Einschaltstrom,Stromsonde:
90A: PCM-3348HR, 34A: RM-3348HR (240V)
(2) Gemessen in EN55103-1:
7A: PCM-3348HR, 8A: RM-3348HR (230V)

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1-1 PCM-3348HR Overview

1-1-1 Outline of the PCM-3348HR

The PCM-3348HR is a 48-channel 24-bit/16-bit digital audio recorder, using 1/2-inch tape in DASH (Digital Audio Stationary Head) and DASH PLUS formats.

In addition to a range of standard capabilities for a digital audio recorder, the PCM-3348HR is compact and has low power consumption, while providing a wide selection of options to meet a variety of operating requirements.

In combination with the supplied RM-3348HR remote control unit, the PCM-3348HR provides not only basic recording and playback functions, but also auto punch-in/out, separate settings for each channel, memory for up to 100 cue points, variable speed playback, time code chase, sound memory, digital copy, and editing functions.

These functions allow the PCM-3348HR to be used as a base component in a wide range of application systems.

1-1-2 Optional Accessories

DMU-3048 digital meter unit

This is a peak level meter, capable of displaying the levels of 48 channels of digital audio signals. It also has out-of-range indications, and peak-hold and calibration functions.
This meter unit allows monitoring of the status of the 48 digital audio channels from a distance.

DABK-3343HR converter board pack

This is a set of AD/DA converter boards specially designed for the PCM-3348HR.

Related manuals

The following manuals are available as options.

- SRIF-1 protocol manual
  (SRIF-1 version 1.1) 9-976-074-XX
- SRIF-3 protocol manual
  (SRIF-3 version 1.0) 9-976-076-XX
- APIB protocol manual 9-976-078-XX
- 9-pin protocol manual

2-1 Basic Connections

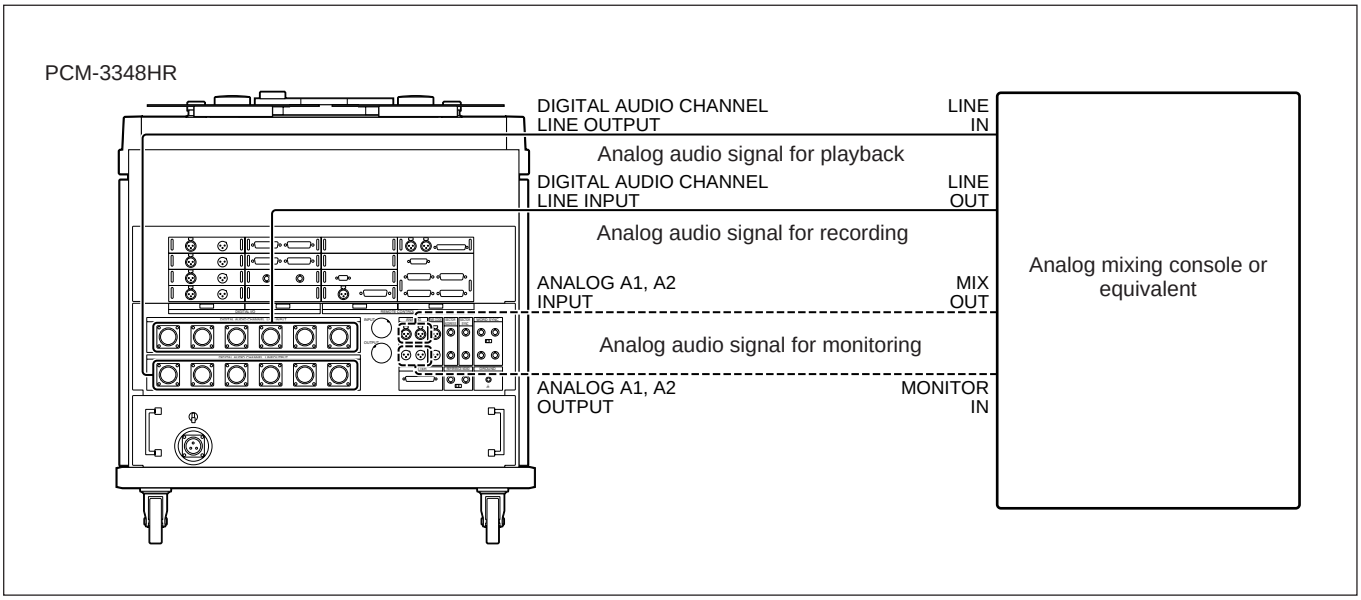
2-1-1 Notes on Installation and Connections

- Ensure that the ventilation openings in the rear panel are not obstructed.
- Ensure that all equipment is powered down before making any signal connections.
- Read the operation manual for each device before installing or operating it.

2-1-2 Connecting the Audio Signals

Connecting the analog audio signal

When using analog audio signals as input/output signals for digital audio channels 1 to 48, and using analog audio channels as cue monitor signals, make the connections as follows.



Analog audio signal connections

Adjusting the gain of analog audio signals for the DIGITAL AUDIO CHANNEL LINE connectors

Adjusting the gain of the input signal

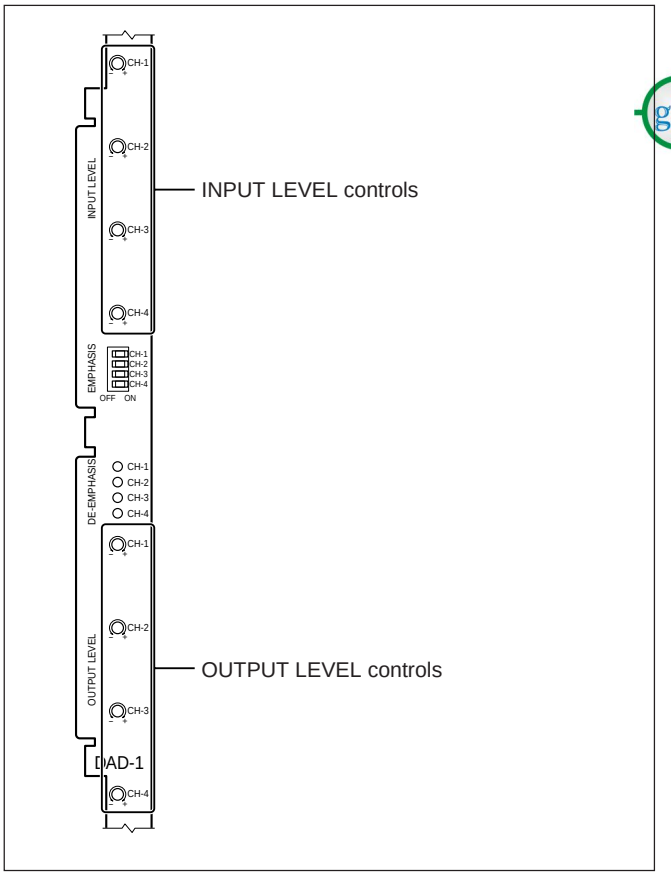
The factory setting is such that for a reference analog audio signal input of +4 dBs (0 dBs = 0.775 V) the level meter has a full scale minus 20 dB indication. Adjust the gain using the INPUT LEVEL controls on the DAD-1 to DAD-12 boards.

Adjustment range: 0 dB to +10 dB

Adjusting the gain of the output signal

The factory setting is such that a full scale minus 20 dB digital audio signal is output as a reference analog audio signal level of +4 dBs (0 dBs = 0.775 V). Adjust the gain using the OUTPUT LEVEL controls on the DAD-1 to DAD-12 boards.

Adjustment range: -10 dB to 0 dB



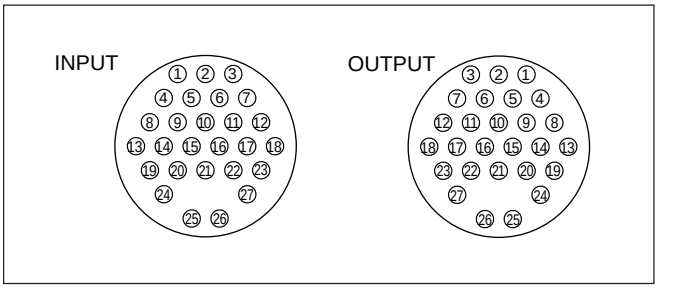
DAD board

Note

The DAD-1 to DAD-12 boards are available only when the optional DABK-3343HR is fitted.

Pin assignment of the multi-cable connectors

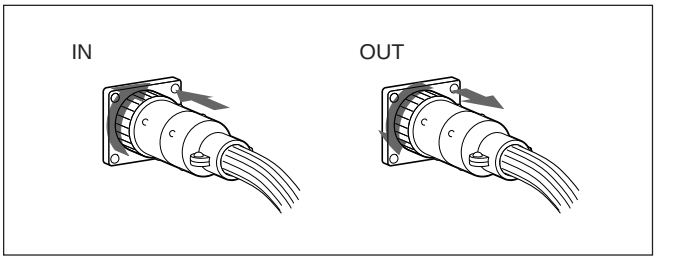
The 27-pin multi-cable connectors are supplied for connection of DIGITAL AUDIO CHANNEL LINE INPUT/OUTPUT connectors.
Make a signal connection for cables, referring to the following chart.



Channel	Pin No.		
	HOT	COLD	GND
1, 9, 17, 25, 33, 41	1	4	8
2, 10, 18, 26, 34, 42	5	6	2
3, 11, 19, 27, 35, 43	3	7	12
4, 12, 20, 28, 36, 44	13	19	24
5, 13, 21, 29, 37, 45	15	14	9
6, 14, 22, 30, 38, 46	17	16	11
7, 15, 23, 31, 39, 47	18	23	27
8, 16, 24, 32, 40, 48	26	25	21

Pin No. 10, 20, 22: No connection

Be sure to fasten the clamp of the connector when making the multi-cable connection.

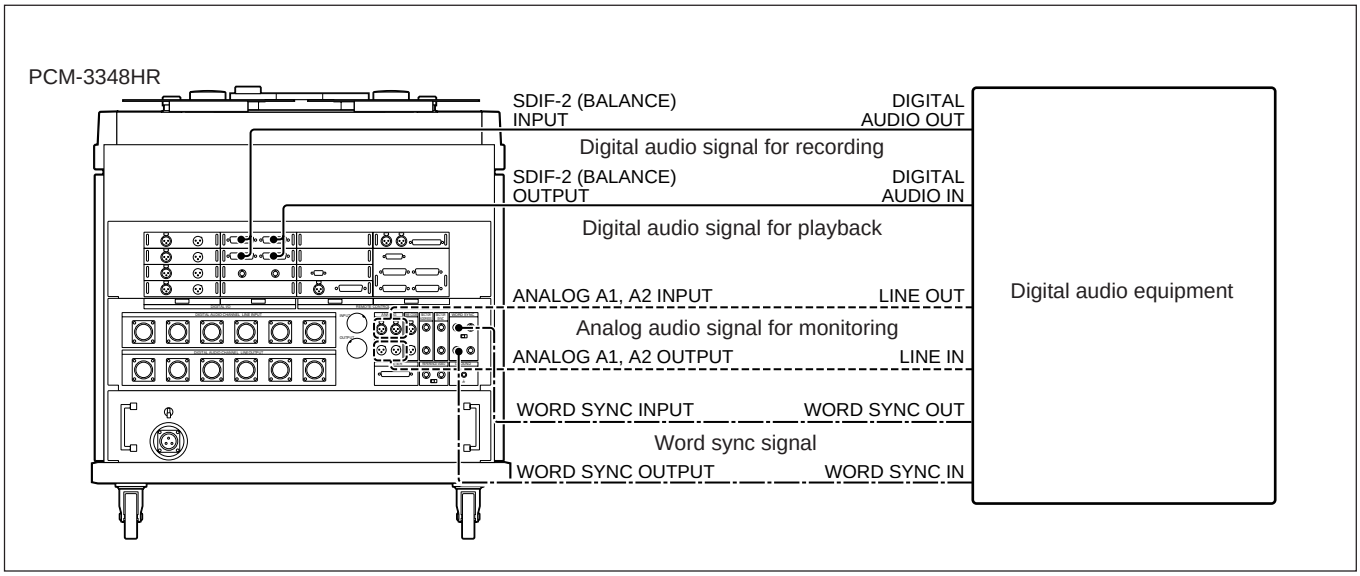


Digital audio signal connections

Make the digital audio input/output connections as follows.

SDIF-2 balanced format

When using signals of this format, word sync signal connections are required.

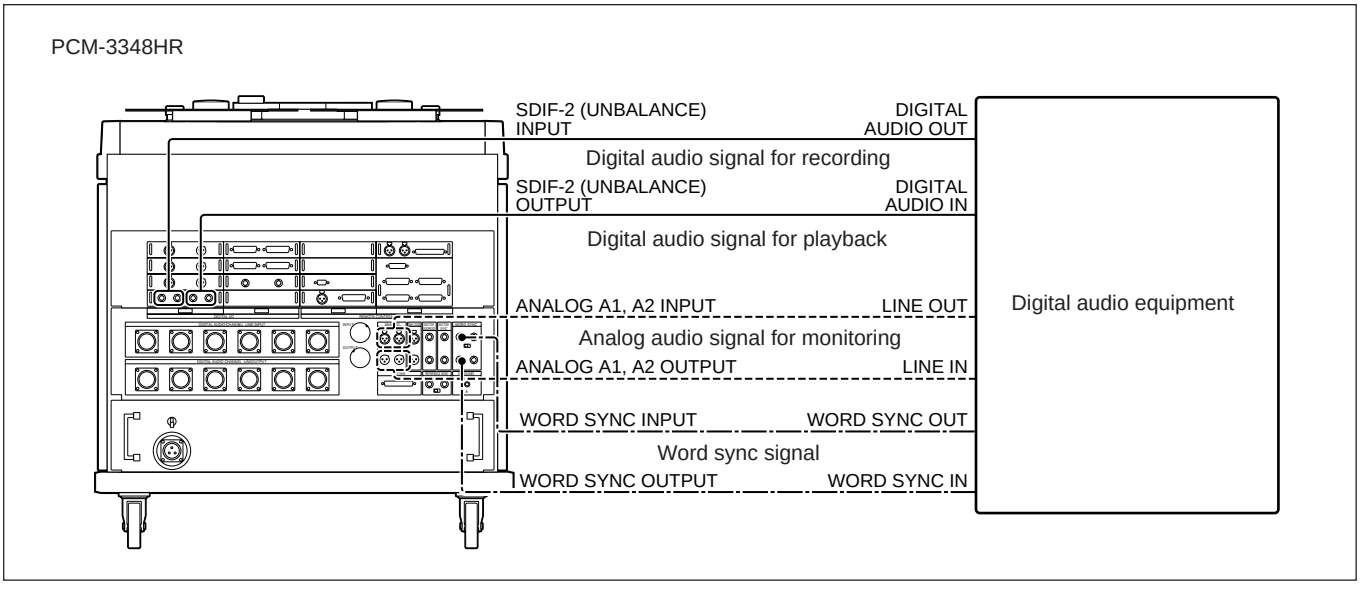


Connections of SDIF-2 balanced format digital audio signals

SDIF-2 unbalanced format

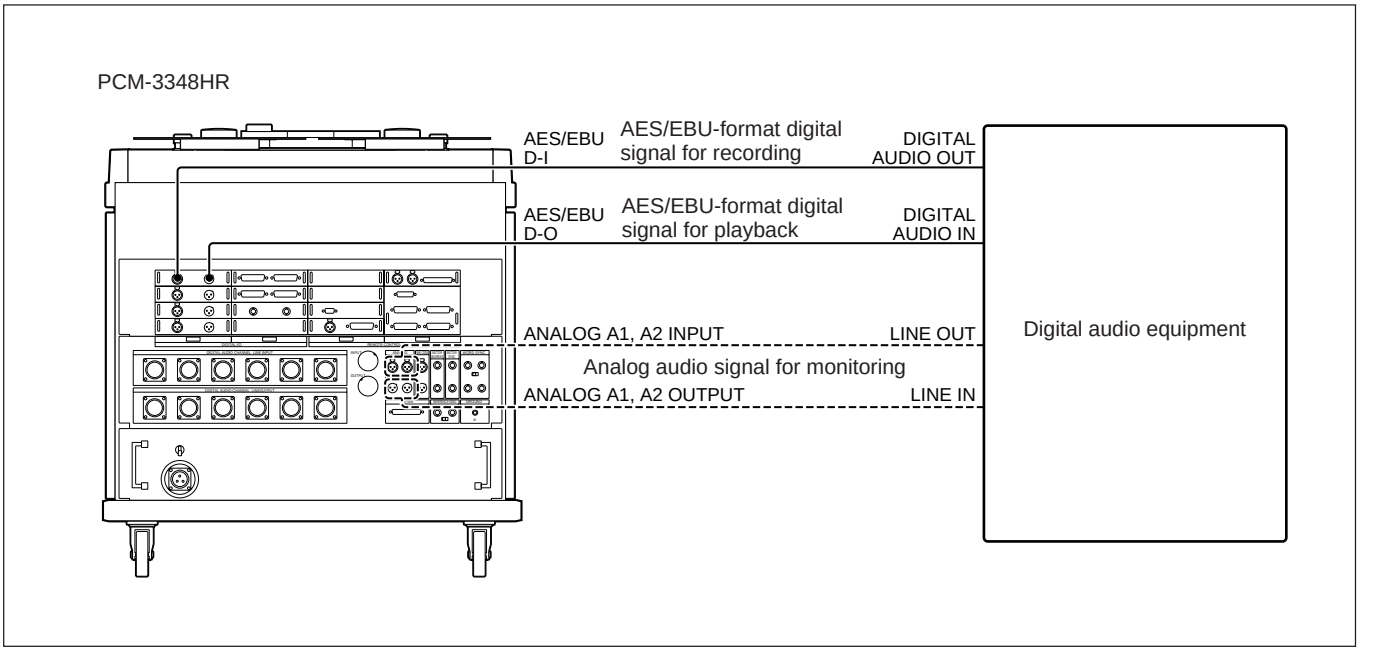
When using the supplied SDIF-2 (UNBALANCE) board, remove one of the AES/EBU boards and insert it in place of the removed one.

This format also requires word sync signal connections.



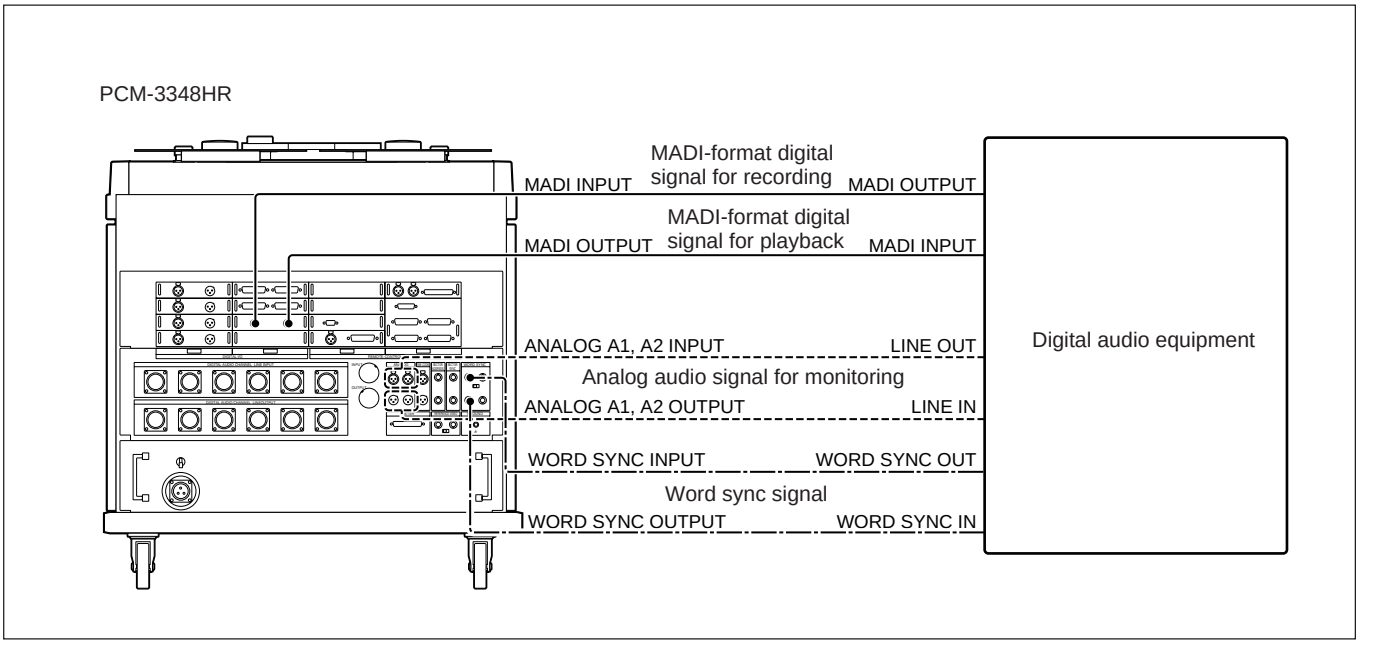
Connections of SDIF-2 unbalanced format digital audio signals

AES/EBU format



Connections of AES/EBU-format audio signals

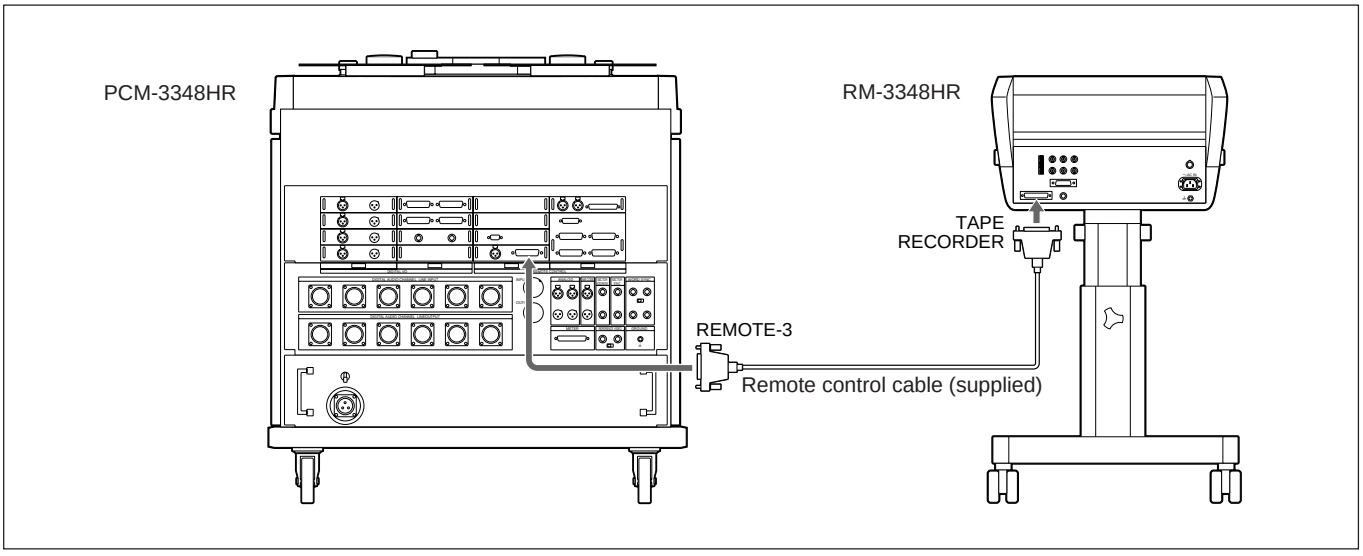
MADI format



Connections of MADI-format audio signals

2-1-3 Connecting the RM-3348HR

Use the supplied remote control cable to connect between the REMOTE-3 connector on the rear panel of the PCM-3348HR and the TAPE RECORDER connector on the rear panel of the RM-3348HR, then fasten the connector screws.



Connecting the RM-3348HR

Notes on use of the RM-3348HR

When the RM-3348HR is not in use

When the RM-3348HR is not in use, disconnect the remote control cable. If you turn on the PCM-3348HR and start operations on the PCM-3348HR with the connected RM-3348HR turned off, tape transport will stop if the RM-3348HR is turned on.

Time display errors

When the sampling frequency is 44.1 kHz or 44.056 kHz, there may sometimes be a discrepancy of ±1 ms in the time shown in the LOCATE TIME display of the RM-3348HR. This arises during the conversion process between sector addresses and the sampling frequency, and does not indicate a malfunction of the equipment.

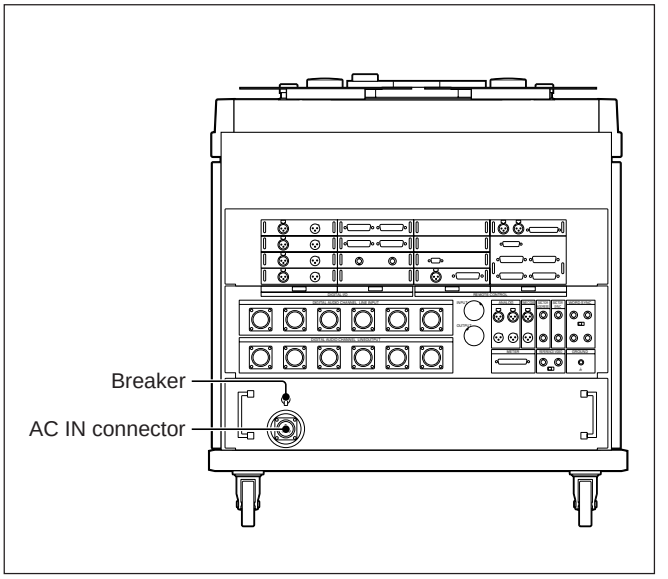
2-1-4 Connecting the Power Supply

Use the following procedure to connect the power supply.

PCM-3348HR

Note

Always use the unit with an independent power outlet rated at least 15 A where supply voltage is 120 V (USA and Canada) and 8 A where it is 220 V to 240 V (Other countries).



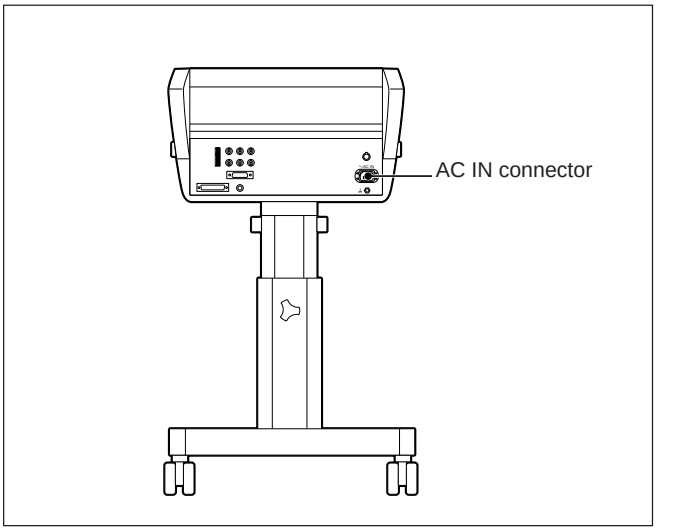
1 Check that the breaker is off.

2 Connect the supplied AC power cord for the PCM-3348HR to the AC IN connector and fasten the clamps.

3 Plug the AC power cord into an AC outlet.

4 Turn the breaker on.

RM-3348HR

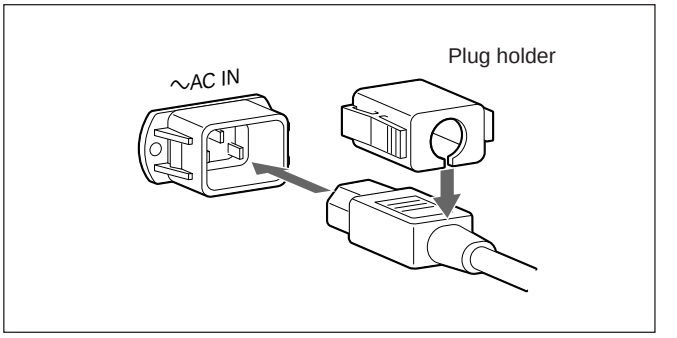


1 Connect the supplied AC power cord for the RM-3348HR to the AC IN connector.

2 Plug the AC power cord into an AC outlet.

Attaching the plug holder

When connecting the cords to the AC IN connectors, attach the plug holders as shown below.



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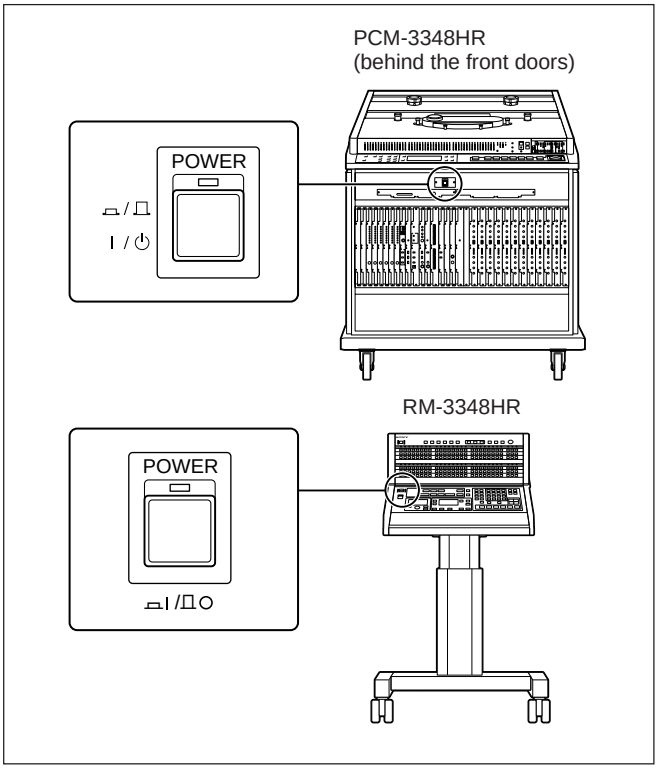
2-2 Powering Up



Location of the POWER switches

PCM-3348HR

Press the POWER switch to light the lamp above the switch.
When powered up, the unit begins a self-diagnosis procedure. At this point the indication "StEP-1" appears on the tape time display. Between 10 and 20 seconds after powering up, the unit enters the following state.

- STOP button: flashing
- ALL CHANNEL REPRO button: lit
- Switches in the system control block
  REC MODE: INSERT
  WORD LENGTH: 24 BIT
  Fs: 44.1 kHz
  EMPH: OFF
  INPUT SELECT: ANALOG
  SYNC CLOCK: INT/X'tal (Crystal)
  TIME CODE READER: not lit
  TIME CODE GEN: 30
  TIME CODE: INT
  SYSTEM CONTROL: LOCAL

RM-3348HR

Press the POWER switch to light the lamp above the switch.
Within a few seconds the RM-3348HR enters the following state.

- STOP button: flashing
- All channels' REPRO buttons: lit
- LOCATE TIME display: 00H00MIN00SEC

Memory backup function

Both the PCM-3348HR and RM-3348HR have a memory backup function, which maintains setting values when the power is turned off and restores them when the respective units are next powered up.

For the memory backup function to operate, proceed as follows.

PCM-3348HR

Set SELECT switch No. 1 (BACKUP) on the MC board to ON.

RM-3348HR

Set switch No. 4 in the upper set of the SELECTOR switches (4 bits) on the rear panel to OFF (BACKUP).

For details, see Section 2-6, "Memory Backup Function" (page 2-18).

2-3 Loading the Tape

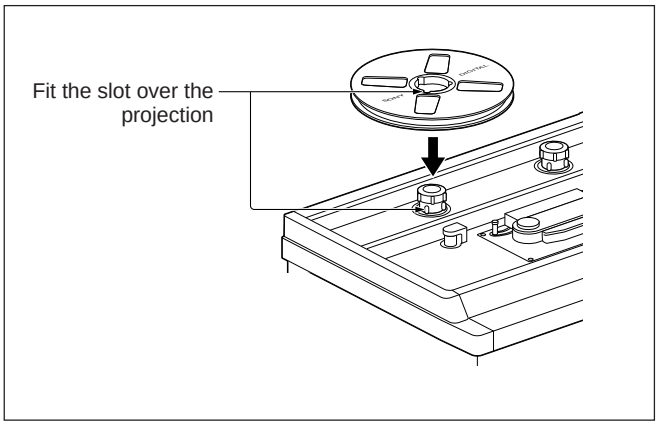
Tape reels to be used

Use 14-inch, 12.5-inch or 10-inch tape reels and empty reels.

Loading the tape

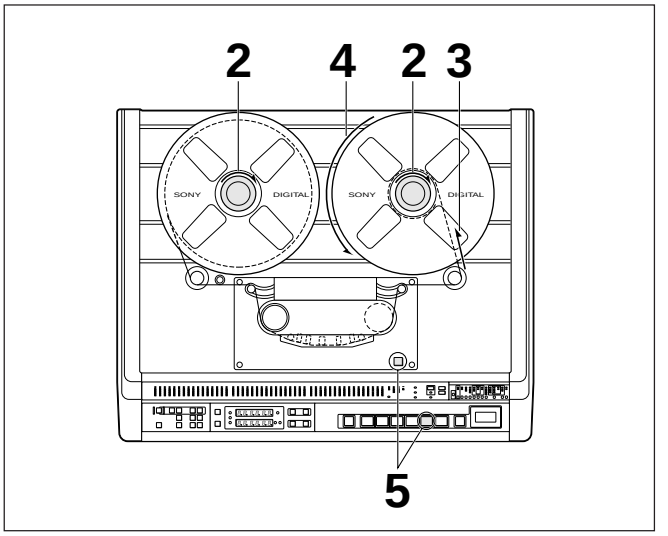
Use the following procedure to load the tape.

1 Aligning the reels so that the slot in the hub fits over the projection on the spindle, mount the tape reel and empty reel.



2 Turn the spindle knob clockwise until it stops to fasten the reel.

3 Thread the tape as shown in the figure.



4 Turn the take-up reel to eliminate slack.

5 Press the tension disarm switch or the STOP button of the PCM-3348HR.

This applies tension, and the tape is then in the loaded state.
The STOP button changes from flashing to continuously lit.

Caution

If there is slack in the tape when it is loaded, this can cause damage to the tape or the tension arms.

Recording the whole length of a previously used tape or using the tape reversed

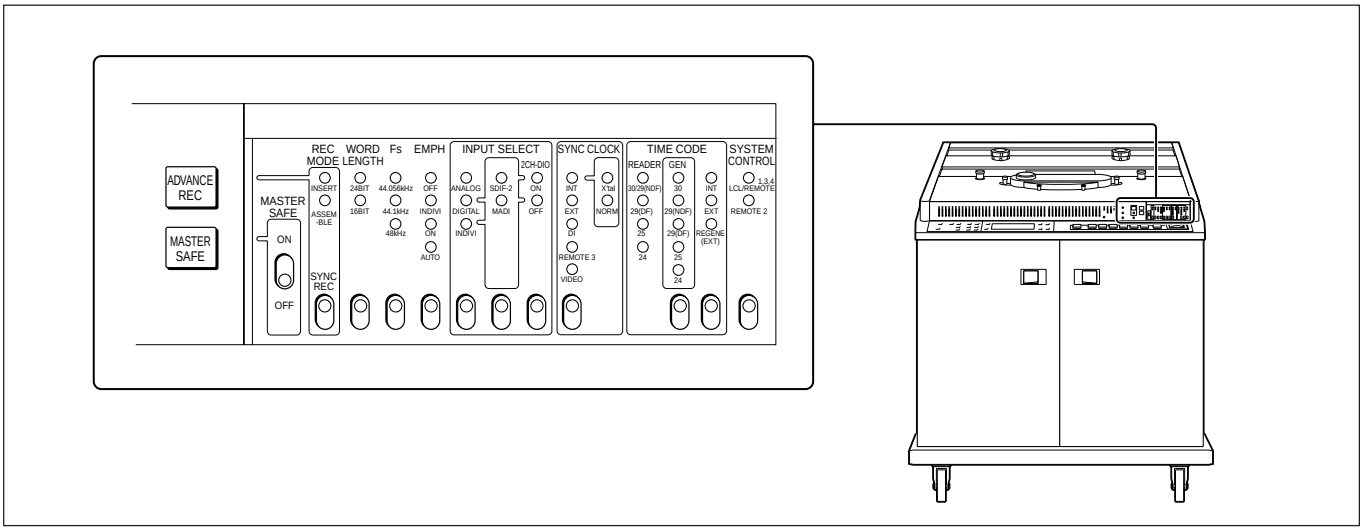
In these cases it is essential to use advance recording, or to prestripe the tape before use.

2-4 Initial Settings

2-4-1 Switch Settings on the System Control Block of the PCM-3348HR

The upper right part of the control panel of the PCM-3348HR includes twelve switches. When the leftmost MASTER SAFE switch is in the upper position, it is on and the MASTER SAFE lamp lights. All of the other switches operate by changing the setting each time they are pressed downward.

The corresponding lamp indicates the state of the setting.
Before starting operation, always check the settings of these switches.



System control block

2-4-2 Selecting the Word Length

Select either 24 bits or 16 bits using the WORD LENGTH selector in the system control block.
Tapes recorded with a word length of 16 bits are compatible with those recorded with conventional DASH-format devices.

Note

Unlike that of the sampling frequency, the value of the word length used in recording is not automatically selected in playback. Be sure to select an appropriate value before starting playback.

2-4-3 Selecting the Sampling Frequency

Sampling frequency for prestriping or advance recording

With the Fs switch on the system control block, select 44.056 kHz, or 48.0 kHz. The selected frequency is recorded on the CTL track on the tape as the Fs ID code (sampling frequency identification code), and is also set as the AES/EBU digital I/O Fs ID code, and as the sampling frequency for internal operation in the PCM-3348HR.

Setting the FS SHIFT switch on the CTK board to ON switches to Fs shift mode, and when the sampling frequency selected on the system control block is 44.1 kHz or 48.0 kHz, the 44.1 kHz or 48.0 kHz lamp flashes. In this case, the sampling frequency used for internal operation of the PCM-3348HR shifts down from the selected frequency by 0.1 %. The Fs ID code, however, remains at the setting on the system control block.

Sampling frequency other than for prestriping or advance recording

For insert recording, assemble recording, or playback, both the AES/EBU digital I/O Fs ID code and the sampling frequency used for internal operation are automatically set to the sampling frequency recorded on the CTL track.

2-4-4 Selecting the Input Signal

The relationship between input signals and input connectors is shown in the following table.

Input signals and input connectors

Input signal	Input connector
Analog audio signal	DIGITAL AUDIO CHANNEL LINE INPUT
Digital audio signal (48 channels)	SDIF-2 (BALANCE) INPUT
Digital audio signal (AES/EBU-format 2 channels)	AES/EBU D-I
Digital audio signal (SDIF-2-format 2 channels)	SDIF-2 INPUT A/B
Digital audio signal (MADI-format 48 channels)	MADI INPUT

Select the input signal with the INPUT SELECT switch on the system control block and the switches on the panel of the ED-1 board.
The following table shows the relationship between the INPUT SELECT switch setting and the input signal.

INPUT SELECT switch settings and input signals

INPUT SELECT switch setting	2CH-DIO switch setting	Selected signals and channels
ANALOG	—	Analog audio signals for all channels
DIGITAL	ON	Digital audio signals for all channels For the channels selected in Method A, 2-channel digital audio signals are selected.
	OFF	Digital audio signals for all channels
INDIVI	ON	Either analog or digital audio signal individually for each channel. See Method B. For the channels selected in Method A, 2-channel digital audio signals are selected.
	OFF	Either analog or digital audio signal individually for each channel. See Method B.

Method A: Selecting the format for two-channel digital audio signals

1 Set the INPUT SELECT/2CH-DIO switch of the system control block to ON.

2 Select either AES/EBU or SDIF-2 unbalanced format only for the channels set on the RM-3348HR remote control unit.
For other channels, select either SDIF-2 balanced or MADI format.

Method B: Selecting the analog or the digital input signal for each channel

1 Set the INPUT SELECT switch in the system control block to INDIVI.

2 Set the ANALOG/DIGITAL selectors on the ED-1 board to the appropriate position for each channel.

When the INPUT SELECT switch in the system control block is set to INDIVI or DIGITAL

The corresponding indicator, INDIVI or DIGITAL, may flash, indicating the following conditions.

With the 2CH-DIO switch set to OFF:
For any one of the channels for which the digital audio signal has been selected, no signal or an inappropriate signal is supplied to the SDIF-2 (BALANCE) or MADI INPUT connectors.

With the 2CH-DIO switch set to ON:
The signal input to all the digital audio channels set on the RM-3348HR is not appropriate or there are no signals being input.

2-4-5 Selecting the Emphasis

Emphasis using analog audio signal input

When inputting analog audio signals to the digital audio channels, you can use the EMPH switch on the system control panel to enable or disable a preemphasis circuit (50 μs/15 μs CD type). Recording is carried out according to the ON/OFF setting of the EMPH switch, and the emphasis information is written to the tape together with the digital audio signal.
The following table shows the relationship between the EMPH switch setting and the preemphasis circuit.

EMPH switch setting	Pre-emphasis circuit setting
OFF	Turned OFF for all channels
INDIVI	Turned ON or OFF each channel independently
ON	Turned ON for all channels
AUTO	Automatically turned ON or OFF each channel according to the setting data recorded on the tape being played.

Selecting the emphasis setting for each channel

1 Set the EMPH switch in the system control block to INDIVI.

2 Set the 48 switches on the DAD-1 to DAD-12 boards to ON or OFF for each channel.

De-emphasis setting for playback

During playback, the emphasis information on the tape is reproduced simultaneously with the digital audio signals, and the de-emphasis circuits on the DAD-1 to DAD-12 boards are turned on or off automatically according to that information.

EMPHASIS MISMATCH indicator

The EMPHASIS MISMATCH indicator lights up if the emphasis setting of the REC READY channel(s) is not identical to the emphasis information on the tape. Be sure to check this indicator especially when making a recording immediately following the part being played back.

Emphasis using digital audio signal input

Regardless of the settings of the EMPH switch and the switches on the DAD-1 to DAD-12 boards, the input signal is recorded using the emphasis information which it contains. If the switch setting is not identical to the emphasis information on the tape, the EMPHASIS MISMATCH indicator lights up.

2-4-6 Selecting the Clock Signal

You can use the SYNC CLOCK switch on the system control panel to select the synchronizing signal to be used.
The following table shows the relationship between the SYNC CLOCK switch setting and the synchronizing signal.

SYNC CLOCK switch setting and synchronizing signal

SYNC CLOCK switch setting	Synchronizing signal
INT X'tal	Internal master clock signal (crystal precision). The tape transport speed cannot be adjusted.
INT NORMAL	Internal master clock signal (VCO precision). The tape transport speed can be adjusted.
EXT	Synchronizing signal input to the WORD SYNC INPUT connector on the rear panel of the PCM-3348HR
DI	Synchronizing signal input to the AES/EBU D-I connector on the rear panel of the PCM-3348HR
REMOTE 3	Synchronizing signal input via the RM-3348HR remote control unit
VIDEO	Composite video signal input to the REFERENCE VIDEO INPUT connector on the rear panel of the PCM-3348HR

When the SYNC CLOCK switch is not set to INT and no external synchronizing signal is input

The PCM-3348HR synchronizes with the internal master clock. In this case, the INT lamp lights, and the SYNC CLOCK lamp that indicates the SYNC CLOCK switch setting flashes. At the same time the EXT CLOCK ERROR lamp lights.

2-4-7 Setting Input/Output Channels for Two Channels of Digital Audio Signals

Function

For digital audio signals of AES/EBU format and those of SDIF-2 unbalanced format, signals of 2 channels are input/output via a single board. Assign these input/output signals to digital audio channels on the PCM-3348HR.

Procedure

To set the input/output channels for 2-channel digital audio channels, proceed as follows.

1 Press the 2CH DIO SET UP button.

The LOCATE TIME display shows the indications as illustrated on the next page. The indications mean the following.

Indications in channel setting

Indication		Meaning
Slot number		Position of the board slot
Connector number		Identification number of the input/output channels (A/B) of each channel. i.e., Channel B of slot d3 is "6."
Channel number	Blank	No board is installed.
	- -	A board is installed but no channel number is set.
	Figure	Specified digital audio channel number.

2 Press the TRIM+/– button repeatedly until the desired connector number appears.

Each time you press the button, the slot number and the connector number change.

3 Press the REPRO button or INPUT button of the channel to be set.

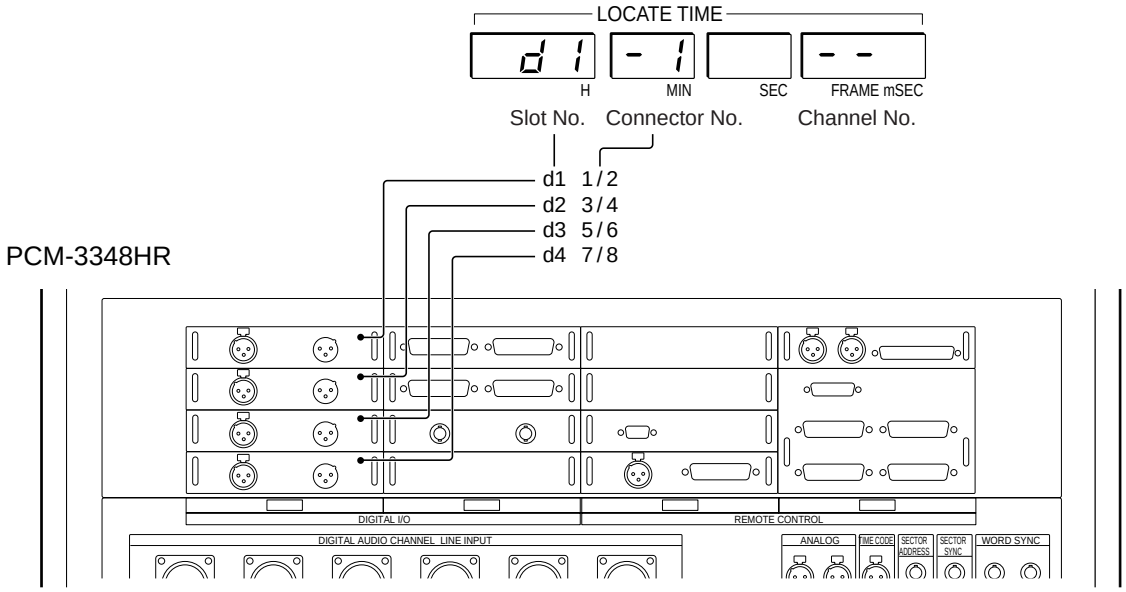
The pressed button flashes and the corresponding channel number is displayed on the LOCATE TIME display.

4 Repeat steps **2** and **3** to assign a channel to each of all the input/output signals.

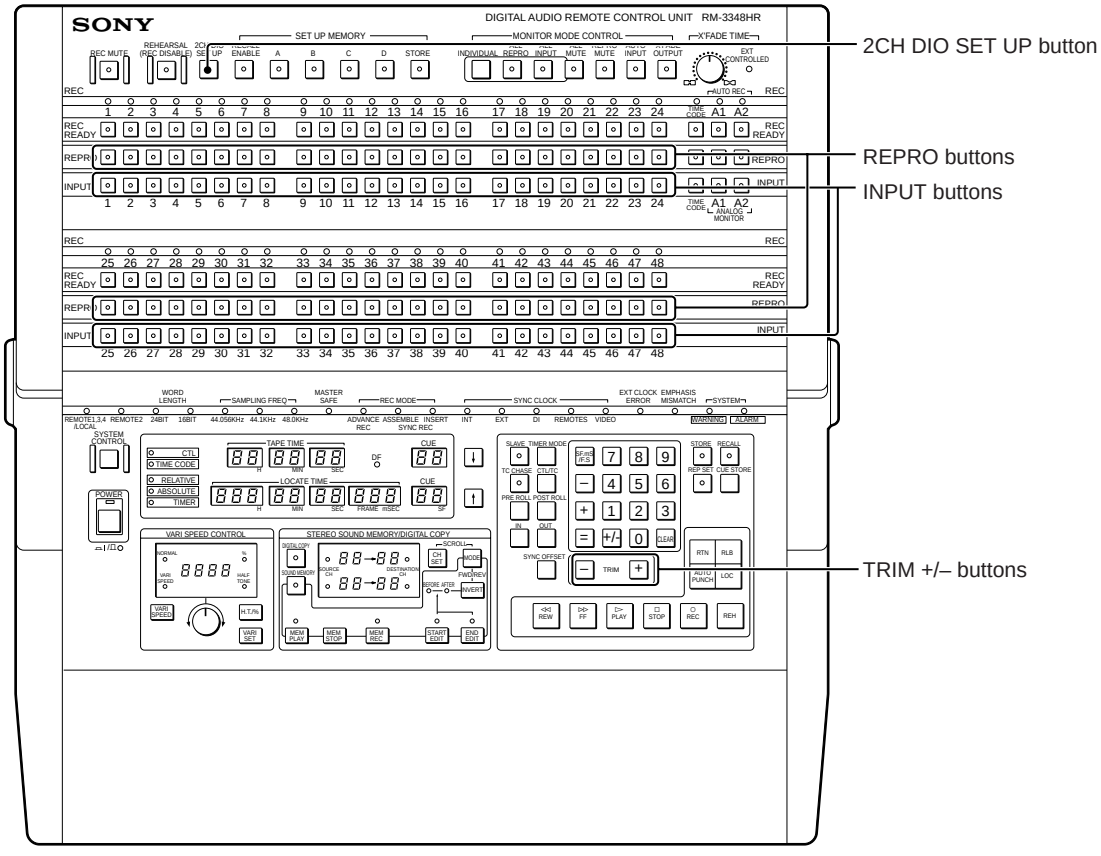
The REPRO and INPUT buttons of the assigned channel light, and the channel displayed on the LOCATE TIME display flashes.

To cancel the channel assignment

Press the TRIM+/– button to display the connector number for which the assignment is to be canceled, then press the REPRO or INPUT button for the digital audio channel to be canceled.
The channel number indication on the LOCATE TIME display changes to "––."



RM-3348HR



Assigning 2-channel digital audio signals to input/output channels

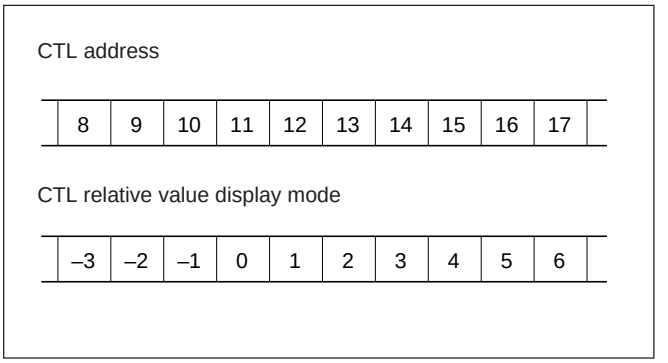
2-5-1 Timer Display Modes

The timer display has four modes for showing the tape time.

- **CTL absolute value display mode**
  This displays the CTL address exactly as recorded on the tape.

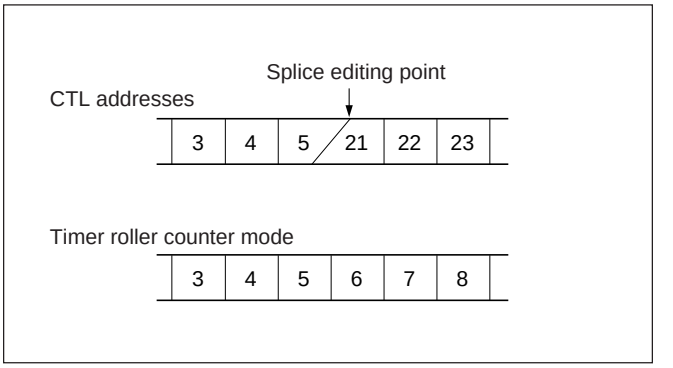
- **Time code absolute value display mode**
  This displays the time code directly, as produced by the internal time code generator, or the external time code or time code recorded on the tape.

- **CTL relative value display mode**
  This shows the tape running time from "0:00:00" at the CTL address set as the reference point. Values before the reference point are indicated as negative.



CTL relative value display mode

- **Timer roller counter mode**
  This displays a count value from the timer roller. In this mode, even if splice editing, for example, has made the CTL addresses discontinuous, the values displayed are continuous.

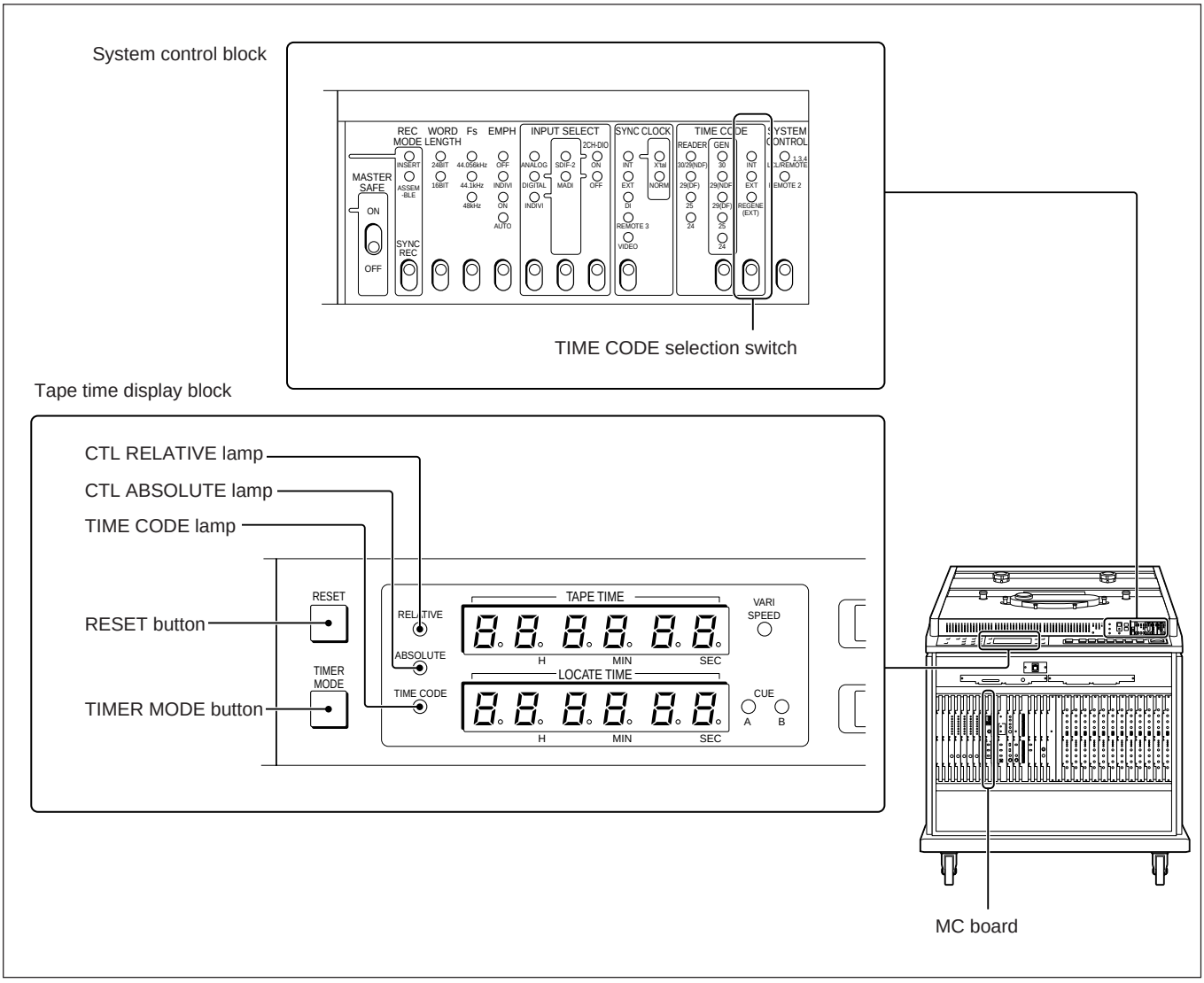


Timer roller counter mode

2-5-2 Setting the Timer Display Mode

To set on the PCM-3348HR

Use the following procedure to set the timer display mode using the PCM-3348HR.



Buttons and lamps used for setting the timer display mode

Selecting CTL absolute mode

Press the TIMER MODE button so that the CTL ABSOLUTE lamp lights.
When recording the CTL signal, for advance recording or assemble recording, for example, select this mode.

Selecting CTL relative mode

Use the following procedure to select CTL relative mode.

1 Press the TIMER MODE button so that the CTL RELATIVE lamp lights.

2 Run the tape, and stop it at the point to be used as the reference point.

3 Press the RESET button.

The tape time display will change to "0:00:00."

With this setting, the tape time display now shows the tape travel from the reference point.

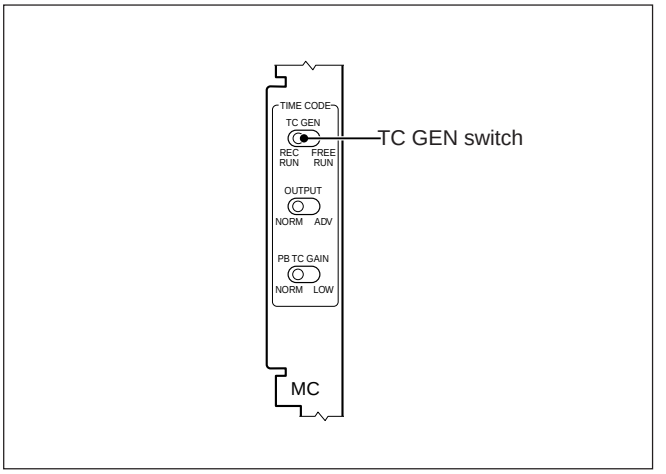
Setting the time code absolute value display mode

Use the following procedure to select the time code absolute value display mode.

1 Press the TIMER MODE button so that the TIME CODE lamp lights.

2 With the TIME CODE selector of the system control block, select INT, EXT, or REGENE (EXT).

3 If you selected INT in step **2**, use the TC GEN switch on the MC board to set the time code run mode to FREE RUN or REC RUN.



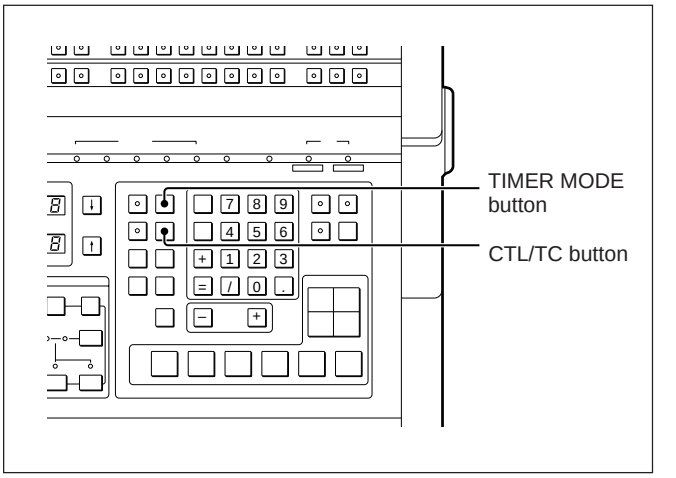
MC board

Setting the timer roller counter mode

It is only possible to set the timer roller counter mode by using the RM-3348HR.

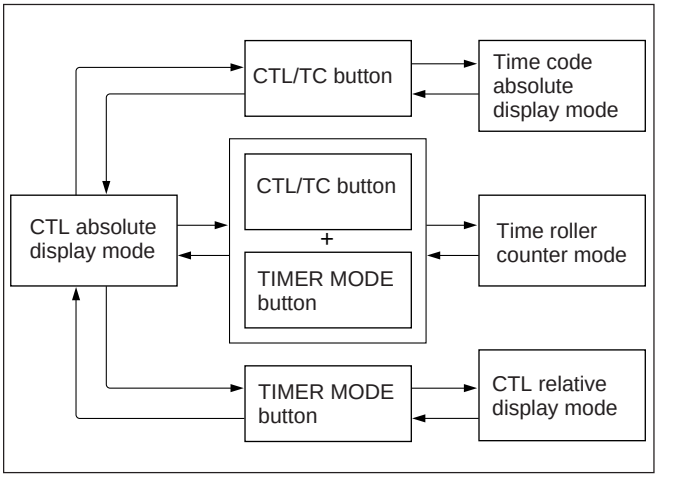
To set on the RM-3348HR

Use the following procedure to set the timer display mode using the RM-3348HR.



Buttons use for setting the timer display mode

Use the TIMER MODE button and CTL/TC button to set the timer display mode.
The following figure shows how to access the various modes with these two buttons.



How to access the various timer display modes

As the diagram shows, the CTL absolute mode is the basic mode from which all other modes are accessed.

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CTL absolute display mode

The time display values in this mode are in the following ranges:

Sampling frequency	Time display value range
48.0 kHz	0 to 74H33MIN55SEC455mSEC
44.1 kHz	0 to 81H09MIN34SEC645mSEC
44.056 kHz	0 to 81H14MIN26SEC820mSEC

For advance recording or assemble recording, always use the CTL absolute display mode.

Time code absolute display mode

The time display values in this mode are in the following ranges:

Time code format	Time display value range
30 DF/NDF (NTSC)	0 to 23H 59MIN59SEC29FRAME
25 (PAL)	0 to 23H 59MIN59SEC24FRAME
24 (film)	0 to 23H59MIN59SEC 23FRAME

CTL relative display mode and timer roller counter mode settings

1 • **For CTL relative mode**
Use the TIMER MODE button to light the CTL lamp and RELATIVE lamp.
• **For timer roller counter mode**
Press the TIMER MODE button and CTL/TC button simultaneously to light the TIMER lamp.

2 Run the tape, and stop it at the desired reference point.

3 Using the numeric buttons, enter the desired time value.

The time value appears on the LOCATE TIME display.

4 Press the ↑ button to transfer the time value on the LOCATE TIME display to the TAPE TIME display.

The time display values in these modes are in the range of ±9H59MIN59SEC999mSEC.
If the value goes outside this range, "O.F.L" appears on the LOCATE TIME display for positive overflow, and "U.F.L" for negative overflow.

2-5-3 Restrictions on Tape Time Functions

Operations only possible in CTL modes

In order to use sector-based synchronization, always select CTL absolute or CTL relative display mode.

When the CTL values are not continuous

Functions which cannot be used

The following functions are based on the CTL addresses, and therefore do not operate correctly even if either using the timer roller counter mode, or if the CTL values are rewritten to be continuous.
• Auto punch-in/out functions
• Sound memory auto start function

Using return playback or repeat playback

Use the following procedure to carry out return playback or repeat playback using a tape on which the CTL values are not continuous, by first recording the time code values consecutively, then using the time code absolute display mode.

1 Locate the tape at the playback start point.

2 Press the PLAY button to play the tape back, and read the time code offset value.

3 Carry out normal return playback or repeat playback.

2-6 Memory Backup Function

2-6-1 Items Held in Backup Memory

The PCM-3348HR and RM-3348HR have a memory backup function.
When the memory backup function is activated, even when the unit is powered down, the following settings are retained for up to three days.

PCM-3348HR

- Channel status
- AUTO INPUT button setting (ON/OFF)
- Timer display mode
- Sampling frequency setting
- Emphasis setting
- INPUT SELECT switch setting
- SYNC CLOCK switch setting

RM-3348HR

- Channel settings (using SET UP MEMORY block)
- Cue point registers (0 to 99)
- Preroll time and postroll time
- IN point and OUT point register
- Sync offset time
- Sound memory playback start point
- Sound memory write start point and end point
- Memory editing start point and end point
- Memory playback time
- Repeat playback and return playback start point and end point
- Variable speed playback data

The following information is not retained.

PCM-3348HR

- Cue points A and B
- Recording mode
- REC MUTE button ON/OFF

RM-3348HR

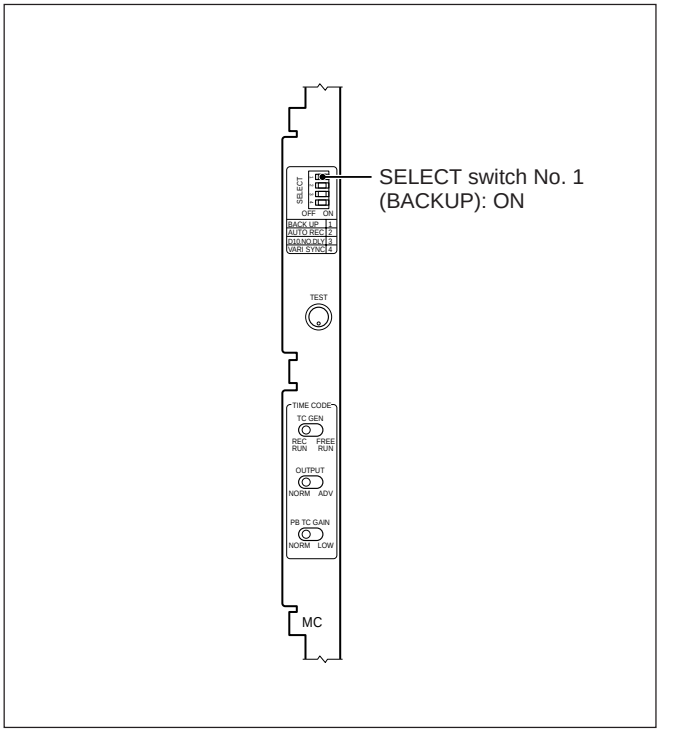
- ALL MODE button ON/OFF
- REPRO MUTE button ON/OFF
- REC MUTE button ON/OFF

2-6-2 Activating the Memory Backup Function

To activate the memory backup function, proceed as follows.

PCM-3348HR

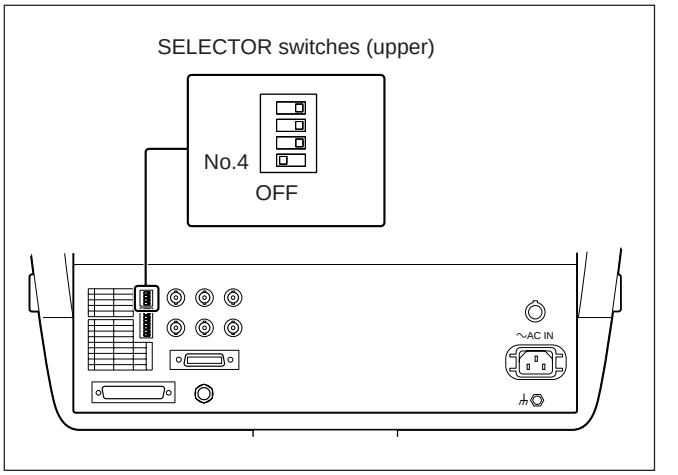
Set the SELECT switch No. 1 (BACK UP) on the MC board to the ON position.



MC board

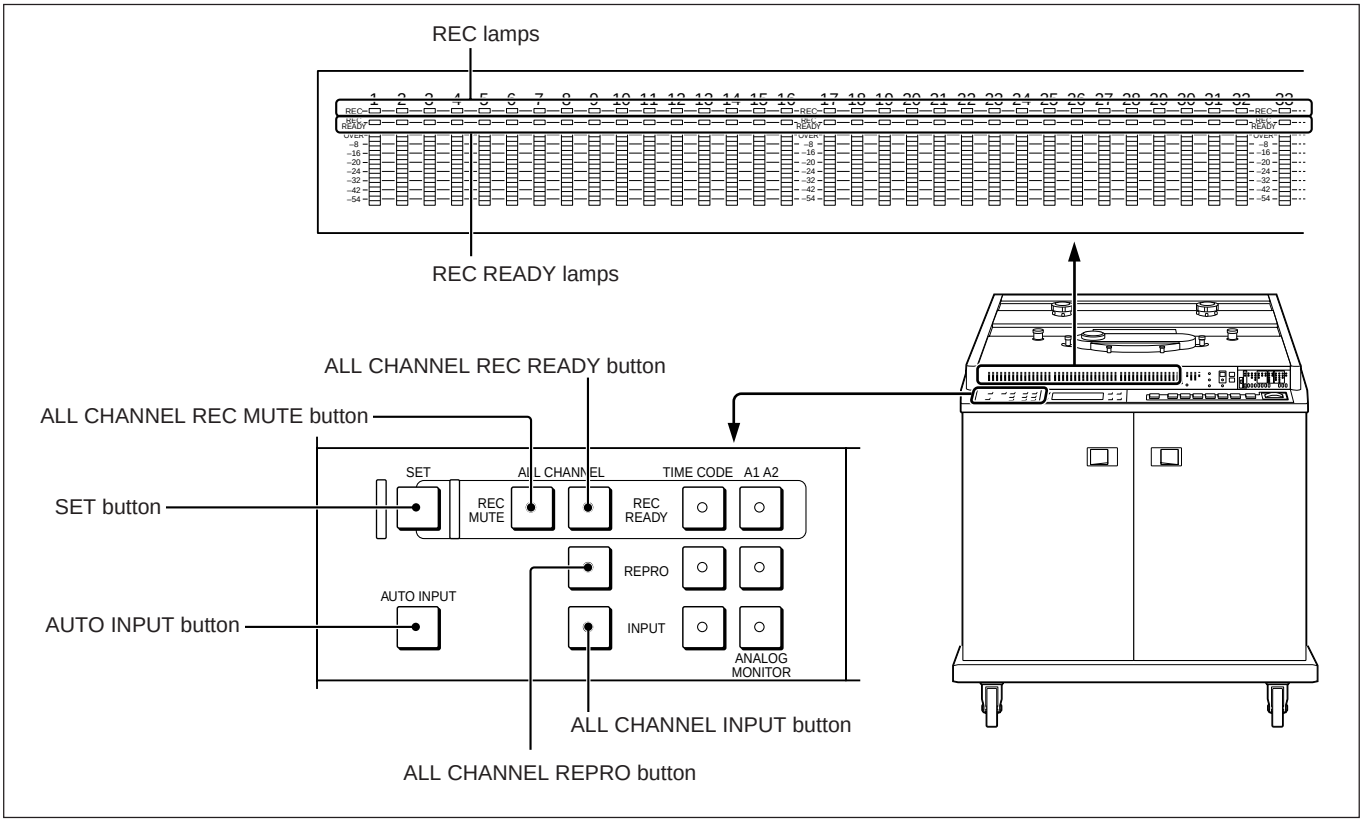
RM-3348HR

Set switch No. 4 in the upper set of the SELECTOR switches (4 bits) on the rear panel to OFF (BACKUP).



3-1 Channel Settings

Buttons and lamps used



Buttons and lamps used for channel settings

Channel settings

• **Selecting REC READY (to allow recording) or SAFE (to prevent recording)**

While holding the SET button down, press the ALL CHANNEL REC READY button.

• **Setting REPRO (playback signal monitor state)**

Press the ALL CHANNEL REPRO button.

• **Setting INPUT (input signal monitor state)**

Press the ALL CHANNEL INPUT button.

When the ALL CHANNEL REC READY, REPRO, and INPUT buttons are lit in low tally

When the RM-3348HR remote control unit has been used to make different settings for individual channels, the corresponding button lights in low tally to indicate this fact.

When both the ALL CHANNEL REPRO and ALL CHANNEL INPUT buttons are unlit, this indicates that monitor output is muted.

The following table shows the relationship between the lamps and the operating state.

Lamps and operating state

Lamp/button	State	Operating state
REC	Lit	Recording for each channel
REC READY	Lit	Recording possible for each channel
ALL CHANNEL REC READY	High tally	Recording possible for all digital audio channels
	Low tally	Recording possible for some channels
	OFF	Recording not possible (SAFE) for all digital audio channels
ALL CHANNEL REPRO	High tally	Playback signal monitor state for all digital audio channels
	Low tally	Playback signal monitor state for some channels
ALL CHANNEL INPUT	High tally	Input signal monitor state for all digital audio channels
	Low tally	Input signal monitor state for some channels

Switching the monitor output automatically, depending on the tape transport state

Press and light the AUTO INPUT button, and the monitor output will switch automatically depending on the tape transport state as shown in the following table.

Monitor output signal and tape transport state

			Tape transport state				
			REC	REH	PLAY	FF/REW	STOP
Channel setting	Digital audio channel	REC READY	Input signal a)	Input signal a)	Playback signal	Input signal	Input signal
		SAFE	Playback signal	Playback signal	Playback signal	Playback signal	Playback signal
	Analog audio channel (AUTO REC: off)	REC READY	Input signal a)	Playback signal	Playback signal	Input signal	Input signal
		SAFE	Playback signal	Playback signal	Playback signal	Playback signal	Playback signal
	Analog audio channel (AUTO REC: on)		Input signal	Input signal	Input signal	Input signal	Playback signal

Operating examples when the AUTO INPUT button is on (insert/assemble recording mode)

Operations		Monitor output
Tape transport operation	REC READY operation	
STOP	Off	Playback signal
	On	Input signal
PLAY		Playback signal
REC		Input signal a)
PLAY		Playback signal
LOCATE		Input signal
PLAY	Off	Playback signal
REC		
	On	Input signal a)
PLAY	Off	Playback signal
STOP		

a) In advance recording mode in these cases the playback signal is output.
In insert recording mode and assemble recording mode, if the monitor is set to REPRO for channels being recorded, both REPRO and INPUT buttons on the remote control unit light, but the monitor output is the input signal.

Setting all digital audio channels to the muting signal recording state

Press and light the ALL CHANNEL REC MUTE button.
To release the muting signal recording state, press the ALL CHANNEL REC MUTE button again to that it goes dark.

3-2 Recording Modes

The PCM-3348HR has three recording modes.

- **Advance recording mode**
  In this mode the CTL signal and digital audio signals are recorded simultaneously; this is used principally for live recording. In this mode, simultaneous playback of the signal being recorded is possible.

- **Assemble recording mode**
  The audio signal and CTL signal are recorded together in sequence as the recording is made.

- **Insert recording mode**
  This mode uses a prestriped tape, already containing a CTL signal.
  The audio signal only is recorded on the digital audio tracks.

The insert recording mode is normally used in a system with the RM-3348HR remote control unit. For details, see Chapter 4.

Normally, first record the CTL and time code in advance recording mode, then switch to insert recording mode to record the digital audio signals.

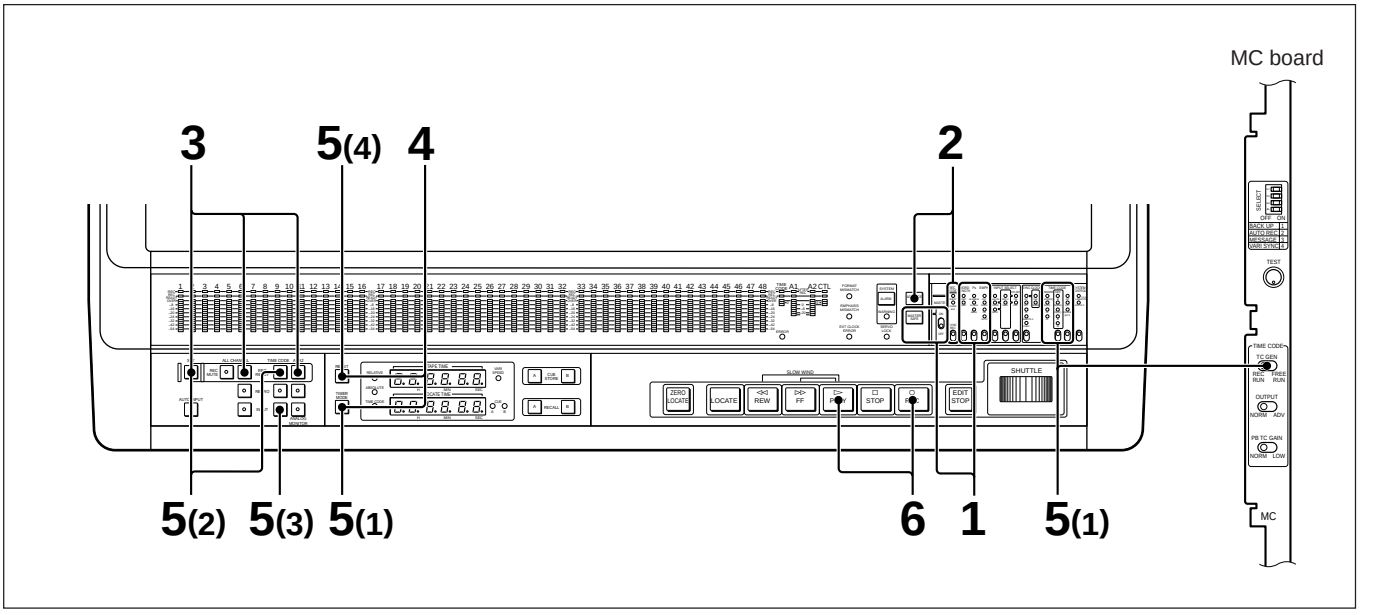
3-3 Prestriping

3-3-1 What Is Prestriping?

Prestriping means recording the CTL signal over the whole length of the tape before recording. This is necessary before using insert recording on a new tape. At the same time as recording the CTL signal, prestriping also writes the time code from the internal time code generator.

3-3-2 Prestriping Operation

Use the following procedure to carry out prestriping.



Prestriping operation

Using the internal time code generator

1 Set the switches as follows.
- MASTER SAFE switch: OFF
- WORD LENGTH switch: Word length being used
- Fs switch: Sampling frequency being used
- EMPH switch: ON or OFF

2 Set REC MODE switch on the system control panel to ADVANCE REC.

3 Holding down the SET button, press the ALL CHANNEL REC READY and A1 A2 REC READY buttons to put all the channels in the recording ready state.

The ALL CHANNEL REC READY and the A1 A2 REC READY buttons light.

4 With the TIMER MODE switch, select CTL ABSOLUTE, and press the RESET button to set the tape time display to "00 H00MIN00SEC."

The tape timer display switches momentarily to "00H00MIN00SEC," then returns to its previous value.

5 **(1)** Set the switches as follows.
TIMER MODE switch: TIME CODE
TIME CODE selection switch: INT
TIME CODE format selection switch: desired format
TC GEN switch on the MC board: REC RUN

(2) Holding down the SET button, press the TIME CODE REC READY button, to set the time code channel to the recording ready state.

The TIME CODE REC READY button lights.

(3) Press and light the TIME CODE INPUT button.

(4) Press the RESET button to reset the internal time code generator to "00 H00MIN00SEC."

6 Holding down the REC button, press the PLAY button.

The REC lamps for all channels light, and recording starts.
The signal level for each channel is displayed on the respective level meter.

To set the CTL and time code start points to desired values

In place of pressing the RESET button in step **4** and **5**, enter a desired time value using the numeric buttons of the RM-3348HR, then press the ↑ button.

The entered time value is sent to the tape time display of the PCM-3348HR.

Using an external time code

In place of step **5** of the procedure "Using the internal time code generator" use the following.

(1) Set the synchronizing signal to VIDEO using the SYNC CLOCK switch on the system control block to synchronize the PCM-3348HR to an external composite video signal.

(2) Set the switches as follows.
- TIME CODE selection switch: REGENE (EXT) or EXT
- TIME CODE format selection switch: Format of the external time code

(3) Holding down the SET button, press the TIME CODE REC READY button to set the time code channel to the recording ready state.

The TIME CODE REC READY button lights.

(4) Press the TIME CODE INPUT button to confirm time code input.

3-4 Advance Recording

3-4-1 What Is Advance Recording?

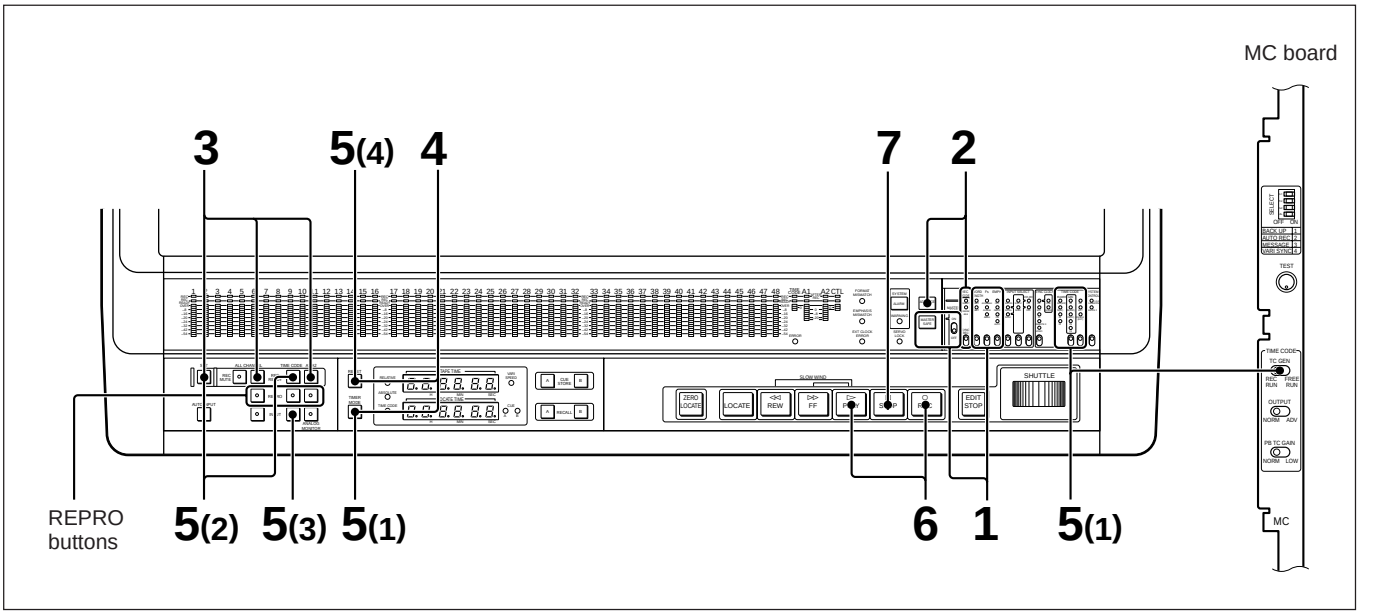
Regardless of any existing signals recorded on the tape, the CTL signal, time code signal and digital audio signals are recorded simultaneously.
This mode is used for live recording.
Simultaneous monitor output for the recorded signal (simultaneous recording and playback) is possible.

Note

Normally, simultaneous recording and playback is only possible during advance recording. However, certain settings on the MC board can enable simultaneous recording and playback for recording on a prestriped tape.
For internal settings of the board, see "MC board" (page A-20) in Appendixes, "Location of Parts and Controls."

3-4-2 Basic Advance Recording

Use the following procedure to carry out advance recording.



Advance recording operation

Using the internal time code generator

1 Set the switches as follows.
- MASTER SAFE switch: OFF
- WORD LENGTH switch: Word length being used
- Fs switch: Sampling frequency being used
- EMPH switch: ON or OFF

2 Set the REC MODE switch on the system control panel to ADVANCE REC.

3 Holding down the SET button, press the ALL CHANNEL REC READY button to set all digital audio channels to the recording ready state.
If you wish to record on analog audio channels A1 and A2, holding down the SET button, press the A1 A2 REC READY button to set channels A1 and A2 to the recording ready state.

The ALL CHANNEL REC READY button lights (and the A1 A2 REC READY button lights).

4 With the TIMER MODE switch, select CTL ABSOLUTE, and press the RESET button to set the tape time display to "00 H00MIN00SEC."

The tape timer display switches momentarily to "00H00MIN00SEC," then returns to its previous value.

5 **(1)** Set the switches as follows.
- TIMER MODE switch: TIME CODE
- TIME CODE selection switch: INT
- TIME CODE GEN format selection switch: Desired format
- TC GEN switch on the MC board: REC RUN

(2) Holding down the SET button, press the TIMECODE REC READY button to set the time code channel to the recording ready state.

The TIME CODE REC READY button lights.

(3) Press and light the TIME CODE INPUT button.

(4) Press the RESET button to reset the internal time code generator to "00 H00MIN00SEC."

6 Holding down the REC button, press the PLAY button.

The REC lamps for all channels light, and recording starts.
The signal level for each channel is displayed on the respective level meter.

7 When recording is finished, continue recording for approximately 30 seconds, then press the STOP button to stop recording.

For simultaneous play while recording

Press the ALL CHANNEL, TIME CODE, A1 or A2 REPRO buttons.

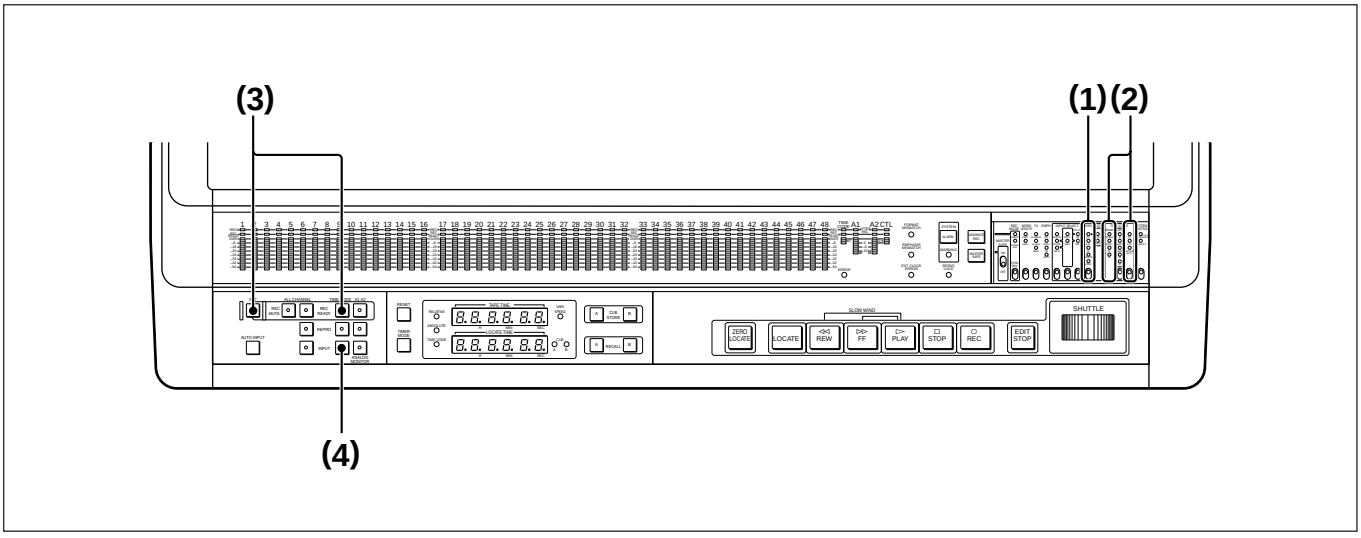
To set the CTL and time code start points to desired values

In place of pressing the RESET button in step **4** and **5**, enter a desired time value using the numeric buttons of the RM-3348HR, then press the ↑ button.

The entered time value is sent to the tape time display of the PCM-3348HR.

Using an external time code

In place of step **5** of the procedure "Using the internal time code generator," use the following procedure.



External time code operation

(Continued)

(1) Use the SYNC CLOCK switch on the system control block to set the synchronizing signal to VIDEO, to synchronize the PCM-3348HR to an external composite video signal.

(2) Set the switches as follows.
- TIME CODE selection switch: REGENE (EXT) or EXT
- TIME CODE GEN format selection switch: format of the external time code

(3) Holding down the SET button, press the TIME CODE REC READY button to set the time code channel to the recording ready state.

The TIME CODE REC READY button lights.

(4) Press the TIME CODE INPUT button to confirm time code input.

If the recording starts from a CTL address other than "00H00MIN00SEC" using advance recording

At the beginning of recording, if you press the PLAY button before the REC button, the CTL address continues from the value recorded on the tape.

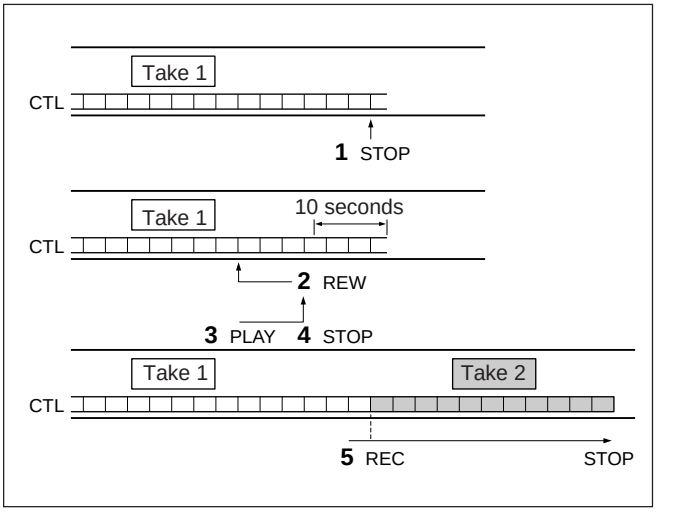
CTL protect mode

If you record the CTL signal on a tape which already contains a digital audio signal recording, that digital audio signal will no longer be able to be played back. To prevent an operational error from losing recorded information in this way in the advance recording mode recording is not possible unless all digital audio channels are in the recording ready state. This is called "CTL protect mode."
If this restriction is inconvenient for your operating requirements, you can circumvent it using a bit switch on the MC board.
For internal settings of the board, see "MC board" (page A-20) in Appendixes, "Location and Function of Parts."

3-4-3 Playing Back While Recording Consecutive Takes

Function

In advance recording mode, if you stop recording temporarily, then continue with the next take on the portion of the tape which does not already have a CTL signal written on it, it is possible to arrange that the CTL address appears to continue successively. Simultaneous play and recording is also possible.



Consecutive recording in advance recording mode

Note

When the CTL address is recorded using this method, you can still use the locate function, but since the actual CTL signals are not continuous, it is not possible to dub a new section of recording to straddle the discontinuity.
If it is necessary to dub in this way, use assemble recording. In this case, however, simultaneous monitoring of the play signal is not possible.

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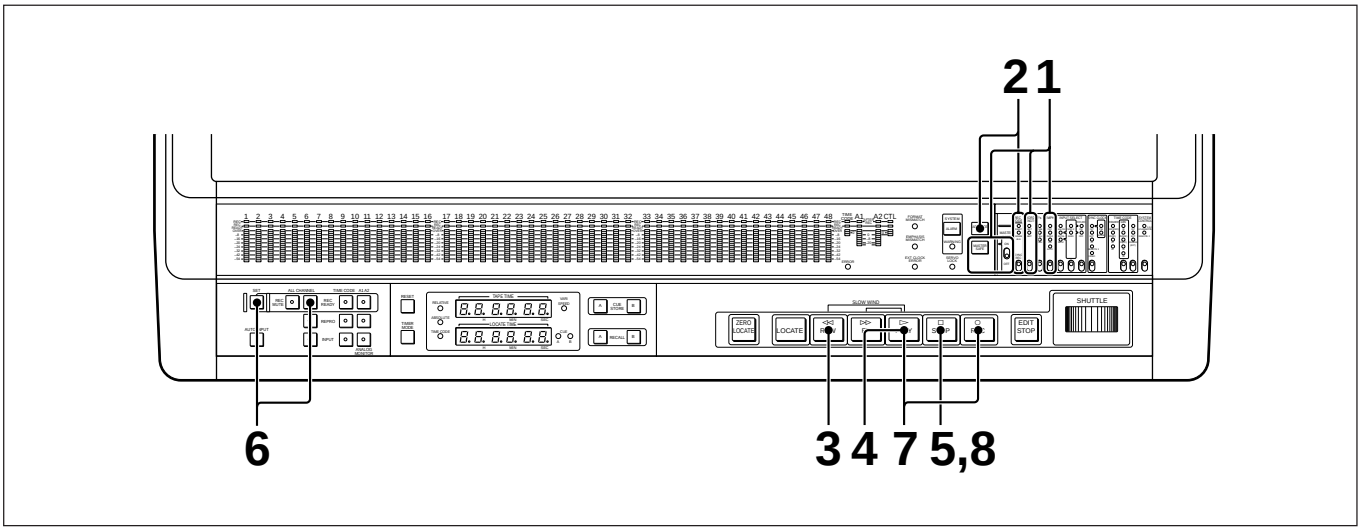
Procedure

Use the following procedure to carry out consecutive recording in advance recording mode.



Consecutive recording operation

1 Set the switches as follows.
- MASTER SAFE switch: OFF
- WORD LENGTH switch: Word length recorded on the tape
- EMPH switch: ON or OFF

2 Set the REC MODE switch in the system control block to ADVANCE REC.

3 Press the REW button to rewind the tape to the previously recorded take.

4 Press the PLAY button, and replay the previous take.

The CTL signal is now being read from the tape.

5 Approximately 10 seconds before the end point of the recording, press the STOP button and stop the tape.

6 Holding down the SET button, press the ALL CHANNEL REC READY button, setting all digital audio channels to the recording ready state.

The ALL CHANNEL REC READY button lights.

7 Holding down the REC button, press the PLAY button.

The REC lamps for all digital audio channels light, and recording starts.
The signal level for each channel is displayed on the respective level meter.

8 When recording is finished, continue recording for approximately 30 seconds, then press the STOP button to stop recording.

3-5 Assemble Recording

3-5-1 What Is Assemble Recording?

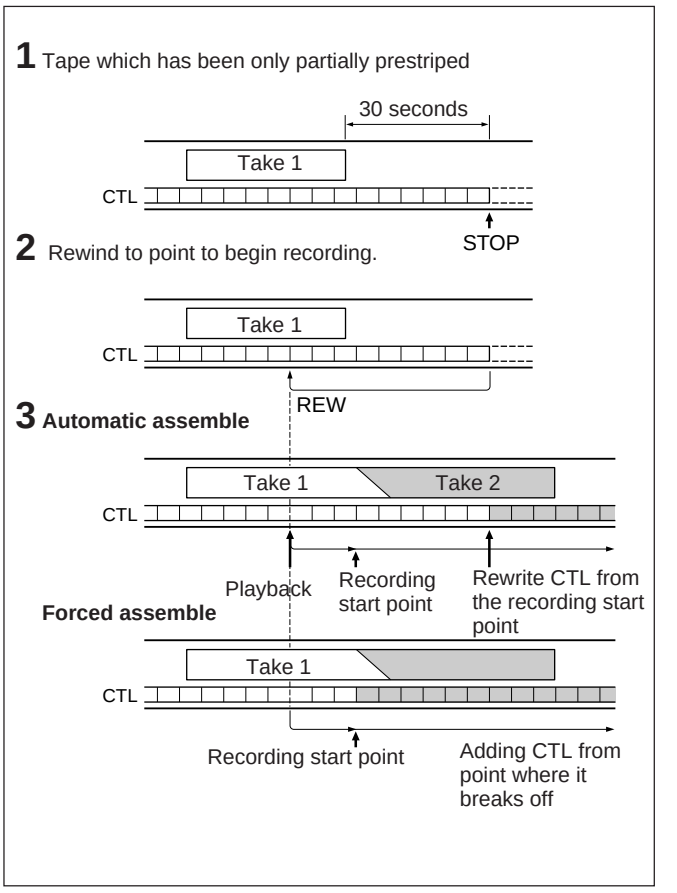
In assemble recording, as in advance recording, the digital audio signals and CTL signals are recorded simultaneously, but unlike the case with advance recording, the CTL address can be recorded consecutively on the tape.
In order to be able to dub a new recording over two previously recorded sections (insert recording), it is necessary to use assemble recording.

In assemble recording there are two ways of adding the CTL signal, as follows:

- **Automatic assemble recording:** The CTL signal continues from where it was broken off.
- **Forced assemble recording:** The CTL signal is overwritten from the beginning of the recording.

The unit is factory set to the automatic assemble recording mode.
To select forced assemble recording, the setting of a bit switch on the MC board must be changed.

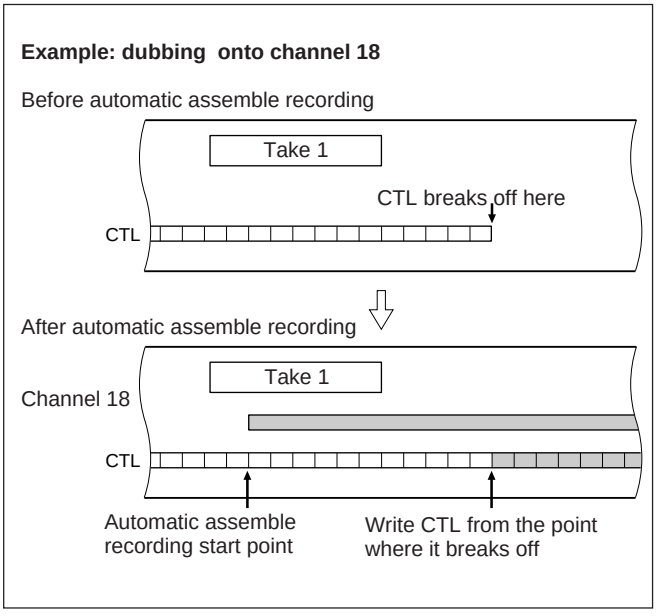
For internal settings of the board, see "MC board" (page A-20) in Appendixes, "Location and Function of Parts."



Assemble recording

Automatic assemble recording

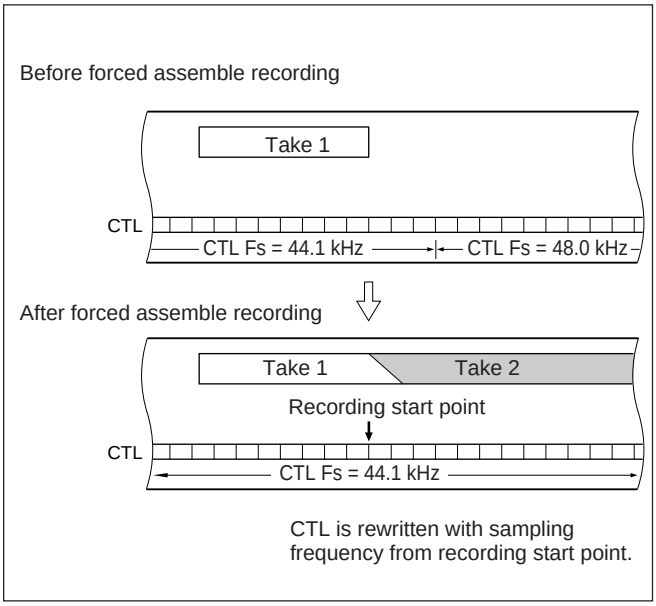
In automatic assemble recording the CTL signal is added from where it was broken off.
For example, to dub one channel onto a tape which has been only partially prestriped, use the RM-3348HR remote control unit to set that channel only into the recording ready state, and carry out an automatic assemble recording.
Since the CTL signal and audio signals can be recorded in a single pass, this method saves operation time when compared with insert recording, where the complete CTL signal is recorded before the digital audio signals.



Automatic assemble recording

Forced assemble recording

In forced assemble recording, CTL is rewritten from the recording start point.
The CTL track is written following the sampling frequency at the recording start point. Therefore, even if the sampling frequency of the CTL being recorded changes, there is no need for prestriping. In this case, however, all digital audio channels must be in the recording ready state.



Forced assemble recording

3-5-2 Assemble Recording Operation

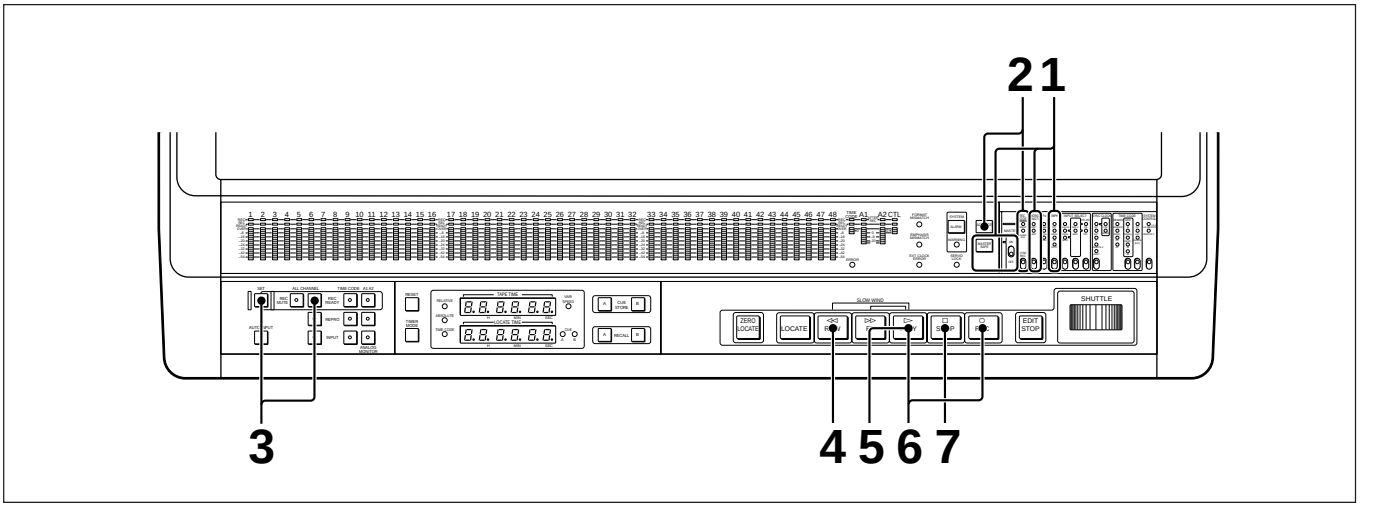
Preparations

Automatic assemble or forced (Automatic assemble is selected at the factory) assemble can be selected with an internal switch on the MC board.

For internal settings of the board, see "MC board" (page A-20) in Appendixes, "Location and Function of Parts."

Procedure

Use the following procedure to carry out assemble recording.



Assemble recording operation

1 Set the switches as follows.
- MASTER SAFE switch: OFF
- WORD LENGTH switch: Word length being used
- Fs switch: Sampling frequency being used
- EMPH switch: ON or OFF

2 Set the REC MODE switch in the system control block to ASSEMBLE.

3 Holding down the SET button, press the ALL CHANNEL REC READY button to put all digital audio channels in the recording ready state.

The ALL CHANNEL REC READY button lights.

4 Press the REW button to rewind the tape to the previously recorded take.

5 Press the PLAY button, and replay the previous take.

The CTL signal is now being read from the previous take.

6 Holding down the REC button, press the PLAY button.

The REC button and the REC lamps for all digital audio channels light, and recording starts.
The signal level for each channel is displayed on the respective level meter.

7 When recording is finished, continue recording for approximately 30 seconds, then press the STOP button to stop recording.

Notes on automatic assemble recording

Always start automatic assemble recording from a point on the tape where the CTL is recorded.
In automatic assemble recording, the unit checks that CTL is recorded when the REC button is pressed. If there is no CTL recorded, the SYSTEM ALARM lamp lights, and the tape time display shows the error code "E.04-14." It is not possible to continue the operation.

Using a previously recorded tape

In assemble recording, the playback head reads the CTL signal from the tape while the recording head is writing new CTL values to the tape. When using a previously recorded tape, the existing CTL values appear on the tape time display, and therefore these displayed values may not necessarily be the same as the values being recorded.

Using CTL protect mode in forced assemble recording

During forced assemble recording, as in advance recording mode, the CTL protect mode is selected by default, and recording is not possible unless all digital audio channels are in the recording ready state.
If this restriction is inconvenient for your operating requirements, you can circumvent it by changing the setting on the MC board.
For internal settings of the board, see "MC board" (page A-20) in Appendixes, "Location of Parts and Controls."

3-6 Analog Audio Channel Recording and Playback

3-6-1 Signals Recorded on the Analog Audio Channels

Analog audio channels A1 and A2 record the signals input to the ANALOG A1/A2 INPUT connectors on the rear panel of the PCM-3348HR.
You can use these recorded signals for cuing during editing.

Note

To increase the signal-to-noise ratio, the analog audio channels use a compander. Therefore, in order to record a pulse signal, it must meet the following conditions.

- Pulse width (attack time plus margin): 5 ms minimum
- Pulse cycle time (release time): 13.5 ms maximum

Automatic recording of analog audio channels

The PCM-3348HR has an automatic recording mode for the analog audio channels. In this mode, if you begin playback with the analog audio channels set to the recording ready state, the signals input to the ANALOG A1/A2 INPUT connectors are automatically recorded on the analog audio channels.
Select the automatic recording mode using SELECT switch No. 2 (AUTO REC) on the MC board. When automatic recording mode is selected, the SYSTEM WARNING lamp lights, and the tape time display shows the warning code "InF 01."
ON: automatic recording mode selected
OFF: automatic recording mode disabled (factory setting)
For internal settings of the board, see "MC board" (page A-20) in Appendixes, "Location of Parts and Controls."

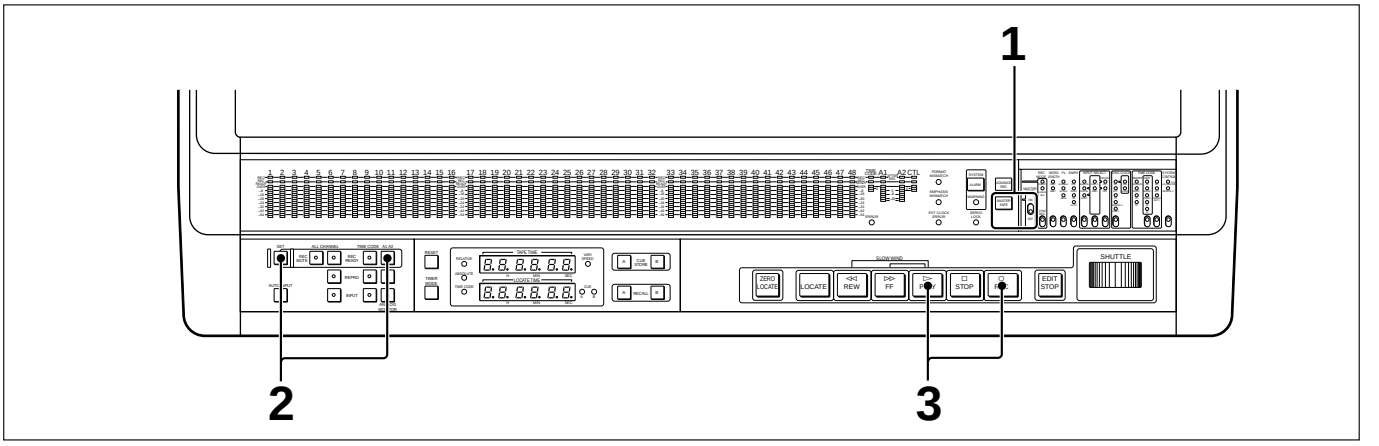
3-6-2 Analog Audio Channel Recording

Preparations

Direct recording on analog audio channels recorded on the PCM-3324A/3324 is not possible. First record muting signals on the analog audio channels on the PCM-3324A/3324, or prestripe the tape again before recording.

Procedure

Use the following procedure to record on the analog audio channels.



Analog audio channel recording

1 Set the MASTER SAFE switch to the OFF position.

2 Holding down the SET button, press the A1 A2 REC READY button to set channels A1 and A2 to the recording ready state.

The A1 A2 REC READY button lights.

3 Holding down the REC button, press the PLAY button. (If using automatic recording mode, press only the PLAY button.)

The REC lamps for channels A1 and A2 light, and recording starts.

3-6-3 Analog Audio Channel Playback

Monitoring during insert or assemble recording

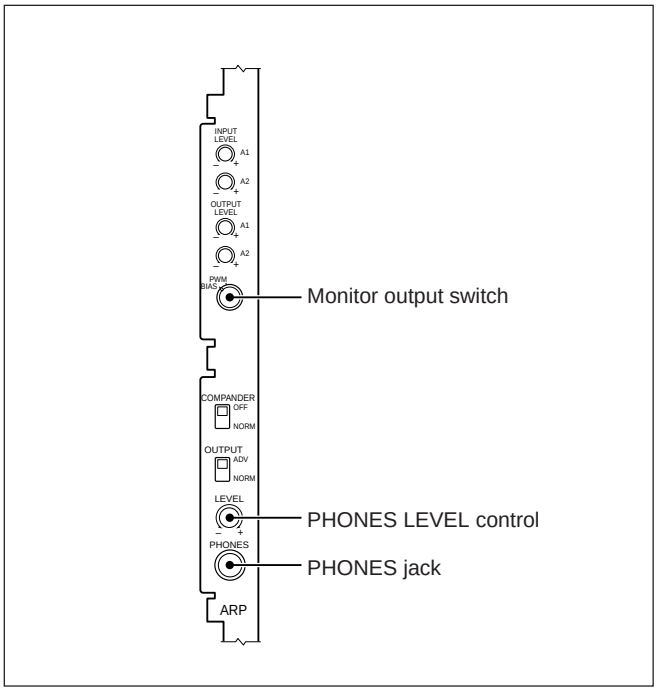
During recording, the input signal is monitored.

Switching the monitor output automatically, depending on the tape transport state

Press and light the AUTO INPUT button.
The monitor output is then automatically switched according to the table on page 3-2.

Monitoring with headphones

You can monitor the sound on the analog audio channels using headphones.
Connect headphones of at least 8-ohm impedance to the PHONES jack on the ARP board panel. Adjust the volume with the PHONES LEVEL control.



ARP board

Playing back analog audio channels recorded on the PCM-3324A/3324

Set the monitor output switch on the ARP board to the BIAS position.

3-7 Time Code Channel Recording and Playback

3-7-1 Time Code Overview

SMPTE/EBU time code channel

This channel is recorded in-line with the digital audio channels during dubbing (insert recording), assemble recording, and advance recording. You can therefore playback the time code recorded on this channel and use it as the time code reference for a synchronizer or mixing console.

Built-in time code generator

- The SMPTE/EBU time code generator/reader is built in, so an external time code generator is not required.
- Select the time code format from the following options.
  30: 30 frames/s, non-drop frame (NTSC)
  29 (NDF) : 29.97 frames/s, non-drop frame (NTSC)
  29 (DF) : 29.97 frames/s, drop frame (NTSC)
  25: 25 frames/s (PAL)
  24: 24 frames/s (film)
- It is possible to generate a time code locked to an external time code read by the time code reader or the playback time code (regeneration).
- When using the PCM-3348HR synchronized to an external composite video signal, it is possible to synchronize the sync phase of the composite video signal and the sync phase of the playback time code (time code sync playback).
  This is convenient when using the PCM-3348HR as the master unit together with a video system.
- The tape time is displayed according to the time code. You can also carry out locate operations using the time code.

Time code output during fast forward and rewind

While the PCM-3348HR is carrying out a fast tape transport operation (fast forward, rewind or locate), a tape shifter mechanism moves the tape away from the heads to protect them. Even with the tape away from the heads, the internal interpolation function still operates, and the TIME CODE OUTPUT connector outputs a continuous time code.

Time code recording methods

The PCM-3348HR provides three methods for recording the time code:

- **External time code through recording**
  In this method, the external time code input to the TIME CODE INPUT connector on the rear panel is recorded directly.
- **External time code regenerated recording**
  In this method, the external time code input to the TIME CODE INPUT connector on the rear panel is regenerated by the internal time code generator, then recorded.
- **Internal time code recording**
  This method records the time code generated by the internal time code generator.

Time code playback methods

The PCM-3348HR provides three methods for time code playback:

- **Time code through playback**
  In this method, the time code recorded on the time code channel is played back unaltered.
- **Time code regenerated playback**
  In this method, the time code recorded on the time code channel is regenerated then played back.
- **Time code sync playback**
  When using the PCM-3348HR synchronized to an external composite video signal, the time code is output with its phase synchronized to the sync phase of the composite video signal.
  There must be a time code recorded on the tape which is synchronized to the composite video signal.

External synchronization with a composite video signal

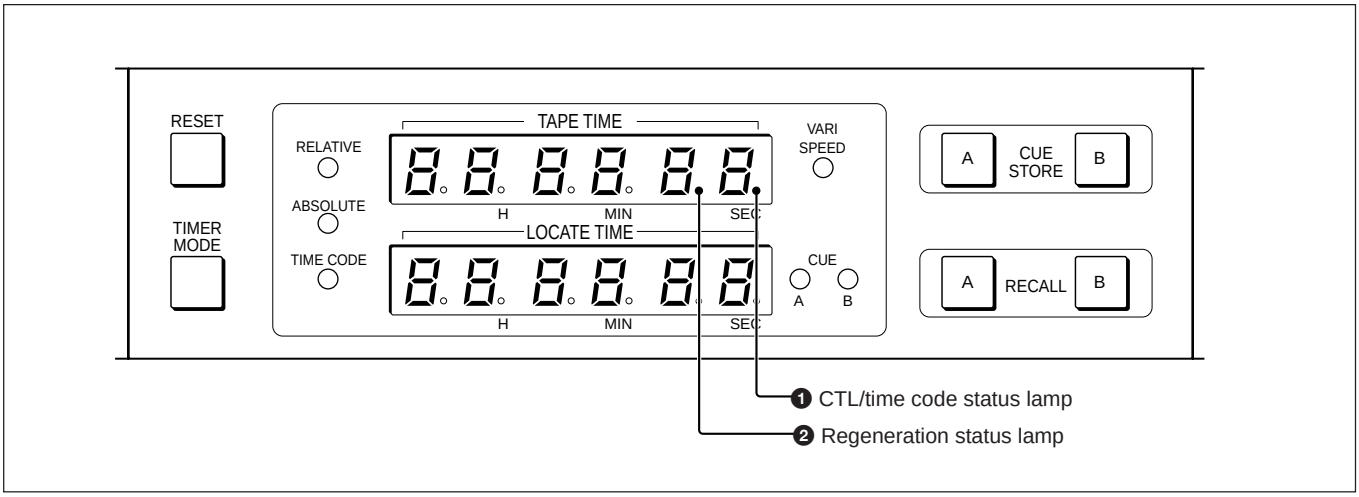
If the PCM-3348HR is synchronized with an external composite video signal, regardless of whether it was synchronized with the composite video signal during prestriping, using the internal time code generator, a time code signal synchronized with the CTL signal can be recorded at any time.

Playback and recording of a time code channel recorded on the PCM-3324A/3324

For playback, set the PB TC GAIN switch on the MC board to LOW.
When recording by advance recording, recording is immediately possible.
For the PB TC GAIN switch, see "MC board" on page 3-20.

3-7-2 Switches and Lamps Used for Time Code Recording and Playback

Tape time display

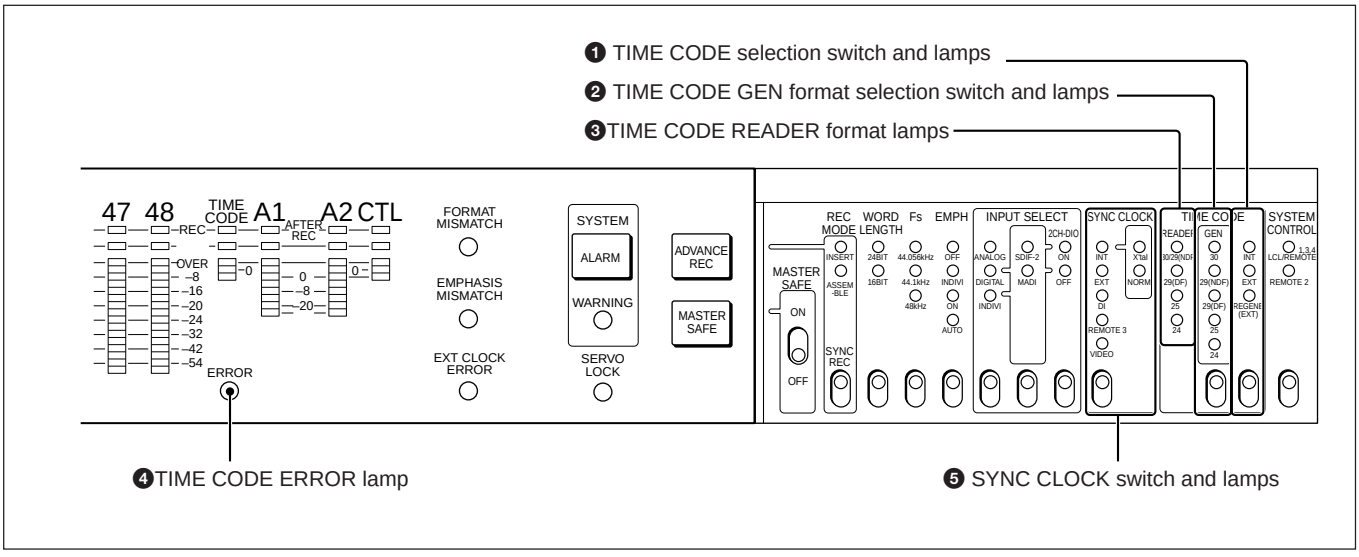


Tape time display

1 CTL/time code status lamp
This lights when the following signals are displayed. It goes off if a signal error occurs.
- Playback CTL
- Playback time code
- External time code

2 Regeneration status lamp
This lights when the built-in time code generator is regenerating the following signals, which are displayed. It goes off if a regeneration error occurs.
- Playback time code
- External time code

System control block



System control block

❶ TIME CODE selection switch and lamps

Select the time code to be recorded on the time code channel from among the following:

INT: Internal time code

EXT: External time code

REGEN (EXT): Time code regenerated by the built-in time code generator locked to the external time code

The lamps show the setting of the TIME CODE selection switch.

❷ TIME CODE GEN (generator) format selection switch and lamps

Select the format for the built-in time code generator from among the following:

30: 30 frames/s, non-drop frame (NTSC)

29 (NDF): 29.97 frames/s, non-drop frame (NTSC)

29 (DF): 29.97 frames/s, drop frame (NTSC)

25: 25 frames/s (PAL)

24: 24 frames/s (film)

The lamps show the following formats:

- When the TIME CODE selection switch is set to INT or EXT: format of the built-in time code generator
- When the TIME CODE selection switch is set to REGEN(EXT): format of the external time code
  When regenerating the external time code, it is not possible to change the format.

❸ TIME CODE READER format lamps

These indicate the following formats:

- When the monitor output is the playback signal: Playback time code format
- When the monitor output is the input signal, and the TIME CODE selection switch is set to EXT: External time code format

Note

When using functions related to time code, make sure that one of the TIME CODE READER format lamps is lit.

One of these lamps lights when the time code format on the tape is read while the tape is being played back.

❹ TIME CODE ERROR lamp

This lights when one of the following formats does not match.

- Playback time code format
- Format selected using the TIME CODE format selection switch
- External time code format

❺ SYNC CLOCK switch and lamps

Select the reference signal for the PCM-3348HR from among the following:

INT: Internal master clock

EXT: Signal input to the WORD SYNC INPUT connector on the rear panel

DI: Signal input to the AES/EBU D-I connector

REMOTE 3: Synchronizing signal supplied via the RM-3348HR

VIDEO: Video signal input to the REFERENCE VIDEO INPUT connector on the rear panel

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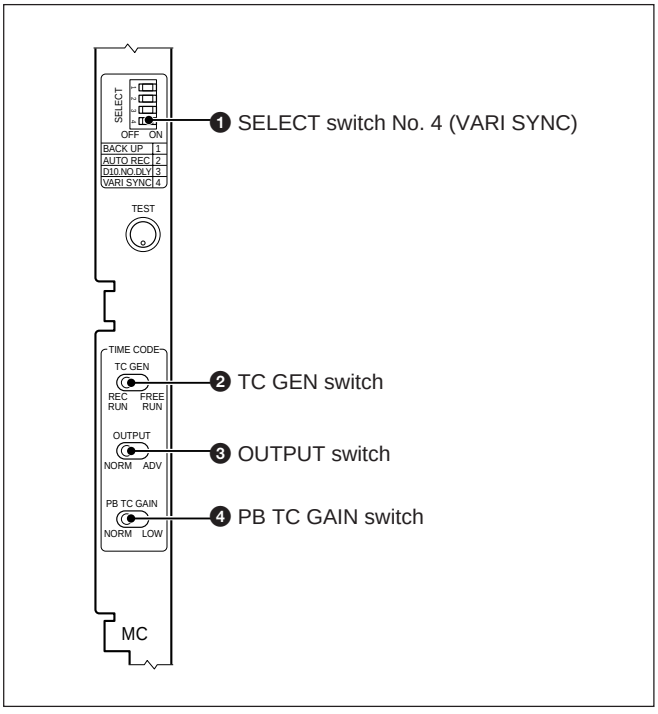
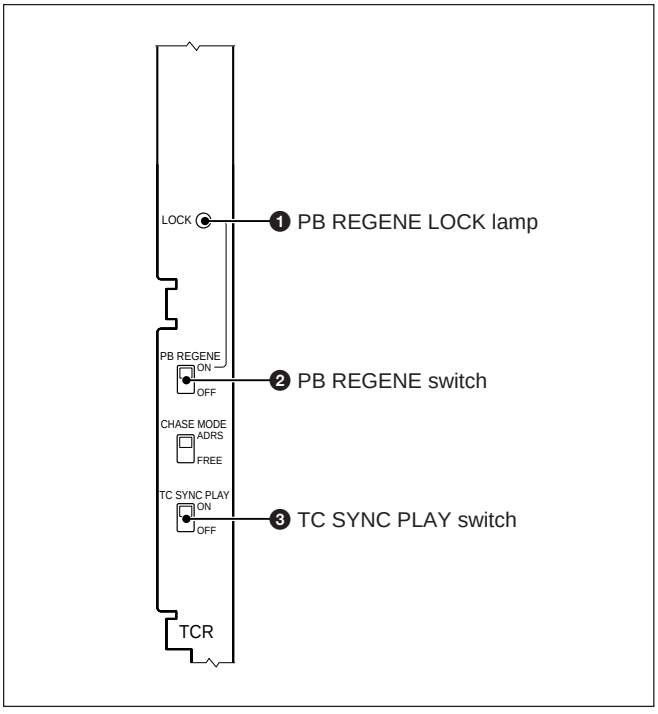
MC board



MC board

TCR Board



TCR board

❶ SELECT switch No. 4 (VARI SYNC)

This selects whether the vari sync function is on or off during time code sync playback.
When this switch is off, the sector sync function is enabled.

❷ TC GEN (time code generator) switch

Select the advancement mode for the time code.
REC RUN: The time code only advances while the PCM-3348HR is actually recording.
FREE RUN: As long as the PCM-3348HR is powered up, the time code advances irrespective of whether or not it is recording.

❸ OUTPUT switch

Select the output timing for the time code.
NORM: The time code is output at the in-line point.
ADV: The time code is output ahead of the in-line point.

❹ PB TC (playback time code) GAIN switch

NORM: For normal use (factory-set position).
LOW: For playback of time codes recorded on the PCM-3324A/3324.

In addition, you can turn the phase correction function of the internal time code generator on and off with an internal switch.
For internal settings of the board, see "MC board" (page A-20) in Appendixes, "Location and Function of Parts."

❶ PB REGENE (playback time code regeneration) LOCK lamp

This lights when a playback time code is input and is being correctly regenerated. If the playback time code ceases to be input, this lamp goes off even if regeneration continues.

❷ PB REGENE (playback time code regeneration) switch

Select whether or not to regenerate the playback time code.
ON: Regenerate the playback time code, and output it from the TIME CODE OUTPUT connector.
OFF: Output the playback time code unaltered from the TIME CODE OUTPUT connector.

❸ TC (time code) SYNC PLAY switch

This enables or disables time code sync playback.
When using time code sync playback, use SELECT switch No. 4 (VARI SYNC) on the MC board to set the vari sync function on or off.

In addition, you can turn the time code interpolation function in fast-forward and rewind modes on and off and select the frame frequency for this function with the internal switches.
For internal settings of the board, see "TCR board" (page A-21) in Appendixes, "Location and Function of Parts."

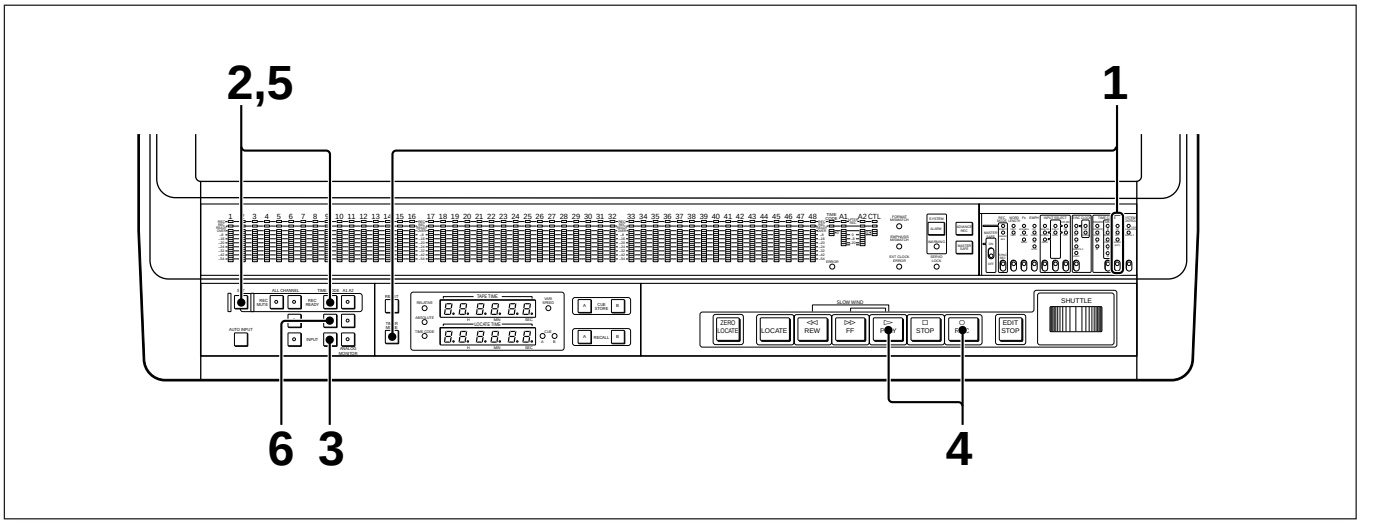
3-7-3 Through Recording of the External Time Code

Function

This function records the external time code input to the TIME CODE INPUT connector on the rear of the PCM-3348HR unaltered on the time code channel.

Procedure

Use the following procedure to record the external time code unaltered.



Through recording of the external time code

1 Set the switches as follows.
- TIMER MODE switch: TIME CODE
- TIME CODE selection switch: EXT

2 Holding down the SET button, press the TIME CODE REC READY button to set the time code channel to the recording ready state.

The TIME CODE REC READY button lights.

3 Press and light the TIME CODE INPUT button.

The TIME CODE channel level meter shows the input level, and the tape time display shows the external time code.

4 Holding down the REC button, press the PLAY button.

The TIME CODE REC lamp lights, and recording begins.

5 When recording is completed, holding down the SET button, press the TIME CODE REC READY button to turn it off.

6 Press the TIME CODE REPRO button to set the monitor output to the playback signal.

3-7-4 Recording the Regenerated External Time Code

Function

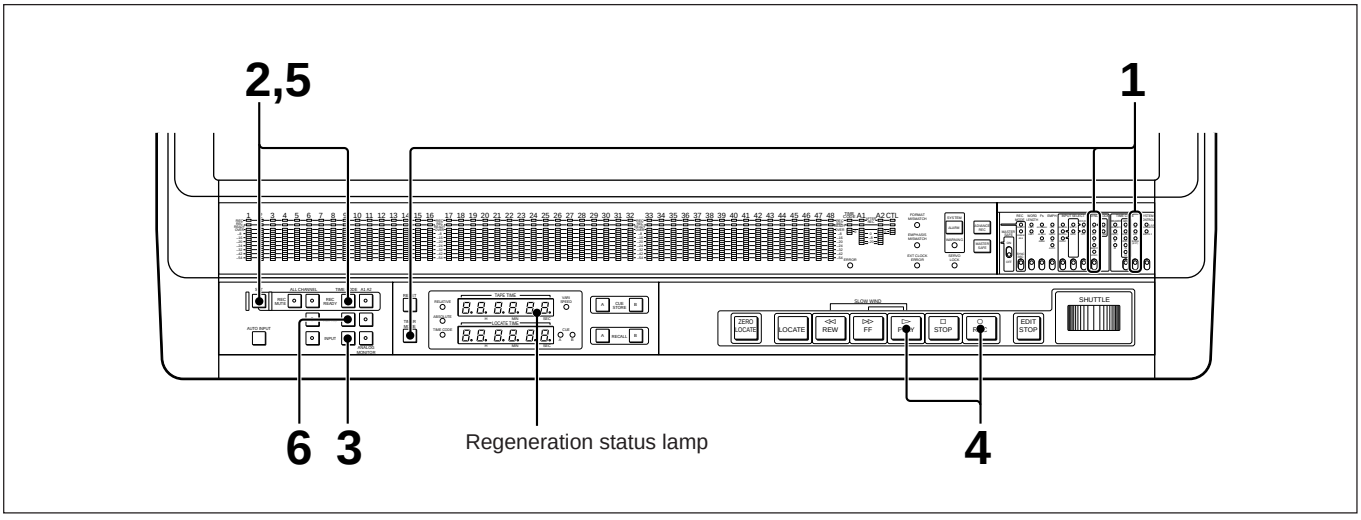
This function records the regenerated external time code which has been input to the TIME CODE INPUT connector on the rear panel of the PCM-3348HR.

Note

If the tape speed is other than normal speed, this function defaults to through recording.

Procedure

Use the following procedure to record the regenerated external time code.



Recording the regenerated external time code

1 Set the switches as follows.
- TIMER MODE switch: TIME CODE
- SYNC CLOCK switch: VIDEO
- TIME CODE selection switch: REGENE (EXT)

2 Holding down the SET button, press the TIME CODE REC READY buttonto set the time code channel to the recording ready state.

The TIME CODE REC READY button lights.

3 Press and light the TIME CODE INPUT button.

The TIME CODE channel level meter shows the input level, and the tape time display shows the external time code. If the regenerate operation is normal, the regeneration status lamp of the tape time display lights.

4 Holding down the REC button, press the PLAY button.

The TIME CODE REC lamp lights, and recording begins.

5 When the recording is completed, holding down the SET button, press the TIME CODE REC READY button, which will then go off.

6 Press the TIME CODE REPRO button to set the monitor output to the playback signal.

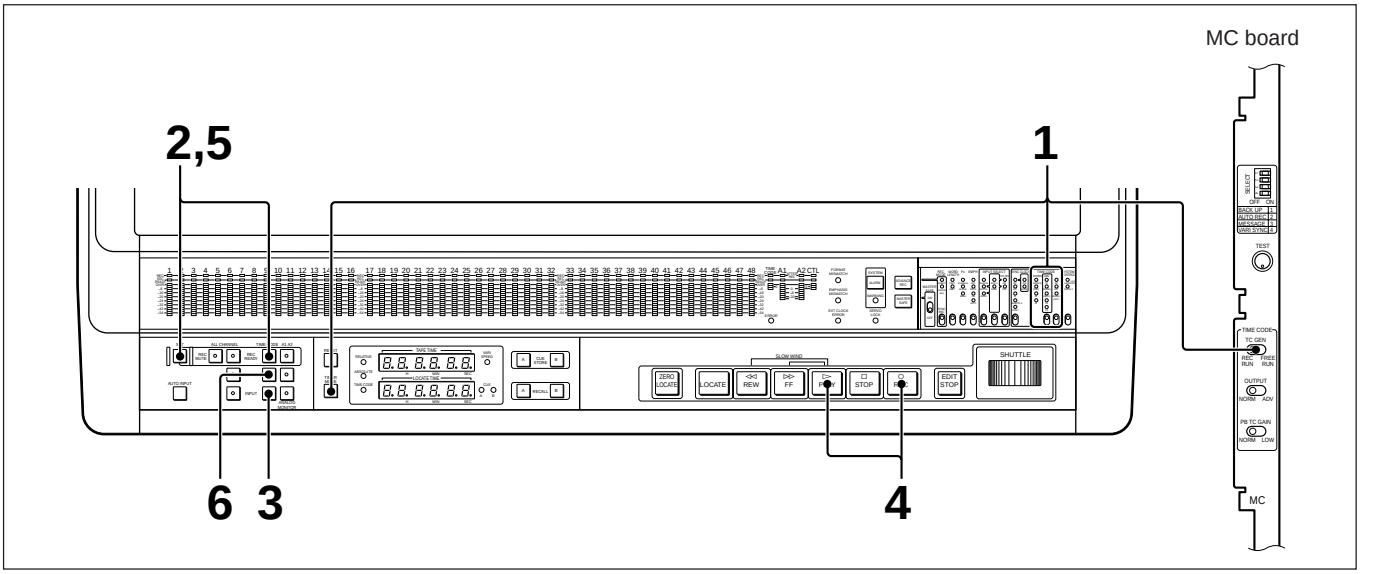
3-7-5 Recording the Internal Time Code

Function

This function records the time code produced by the built-in time code generator. Select the advancement mode for the time code: REC RUN mode, in which the time code only advances while the PCM-3348HR is actually recording, or FREE RUN mode, in which the time code advances as long as the PCM-3348HR is turned on.

Procedure

Use the following procedure to record the internal time code.



Recording the internal time code

1 Set the switches as follows.
- TIMER MODE switch: TIME CODE
- TIME CODE GEN format selection switch: Format being used
- TIME CODE selection switch: INT
- TC GEN switch (MC board): REC RUN or FREE RUN

2 Holding down the SET button, press the TIME CODE REC READY button to set the time code channel to the recording ready state.

The TIME CODE REC READY button lights.

3 Press and light the TIME CODE INPUT button.

The TIME CODE channel level meter shows the input level, and the tape time display shows the output of the built-in time code generator.

4 Holding down the REC button, press the PLAY button.

The TIME CODE REC lamp lights, and recording begins.

5 When the recording is completed, holding down the SET button, press the TIME CODE REC READY button, which will then go off.

6 Press the TIME CODE REPRO button to set the monitor output to the playback signal.

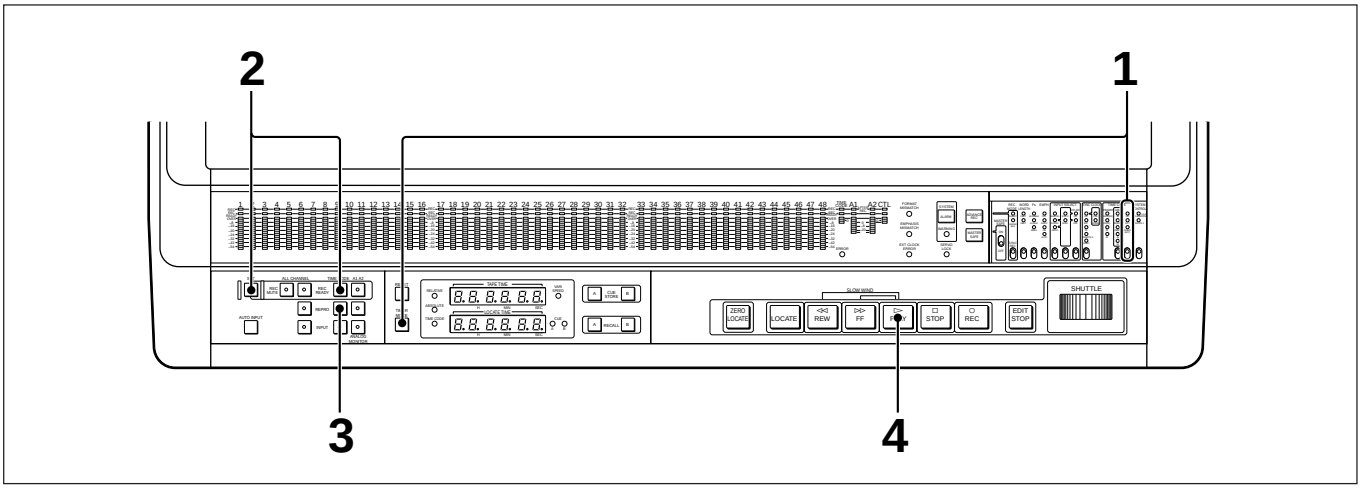
3-7-6 Time Code Through Playback

Function

This function plays back unaltered the time code recorded on the tape.

Procedure

Use the following procedure for through playback of the time code.



Time code through playback

1 Set the switches as follows.
- TIMER MODE switch: TIME CODE
- TIME CODE selection switch: INT

2 If the TIME CODE REC READY button is lit, holding down the SET button, press the TIME CODE REC READY button, turning it off.

3 Press and light the TIME CODE REPRO button.

4 Press the PLAY button to start playback.

As the playback time code is read, the TIME CODE READER lamp for the playback time code format lights.

Note

If you press the STOP button while playing back a time code of low quality, the time code display may momentarily give a spurious indication. This is normal and does not indicate any problem.

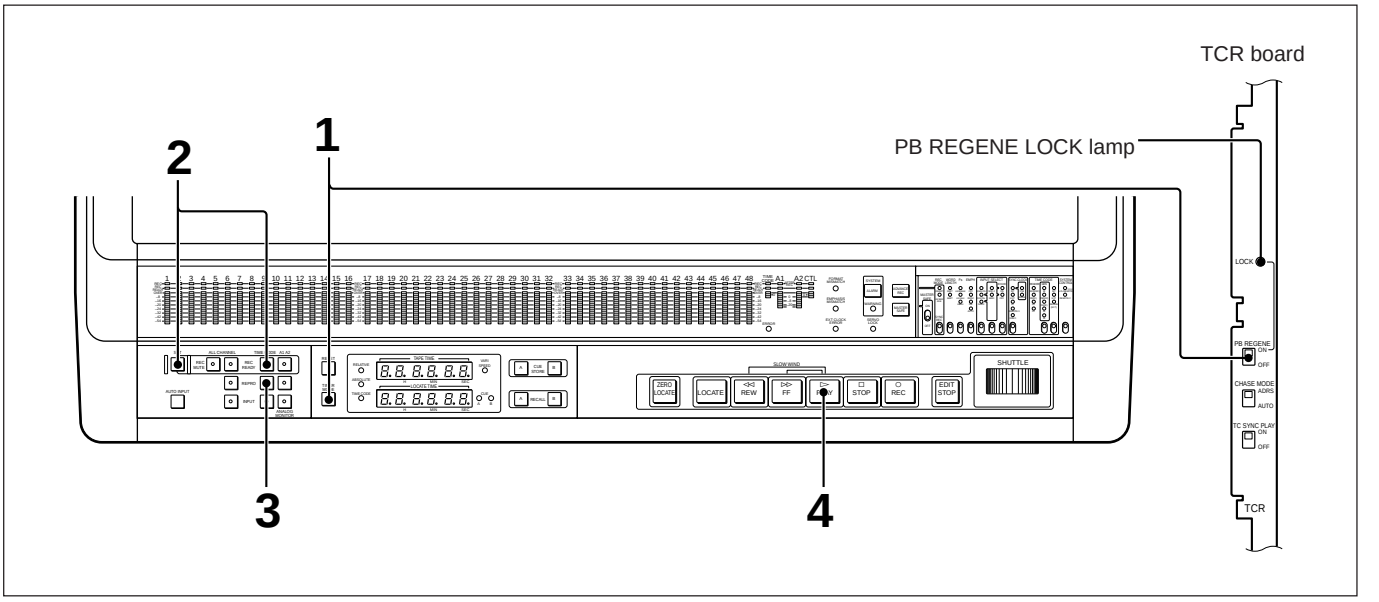
3-7-7 Regenerated Time Code Playback

Function

This function plays back a regenerated version of the time code recorded on the tape.

Procedure

Use the following procedure to play back the regenerated time code.



Regenerated time code playback

1 Set the switches as follows.
- TIMER MODE switch: TIME CODE
- PB REGENE switch (TCR board): ON

2 If the TIME CODE REC READY button is lit, holding down the SET button, press the TIME CODE REC READY button to turn it off.

3 Press and light the TIME CODE REPRO button.

4 Press the PLAY button to start playback.

As the playback time code is regenerated, the PB REGENE LOCK lamp on the TCR board lights.

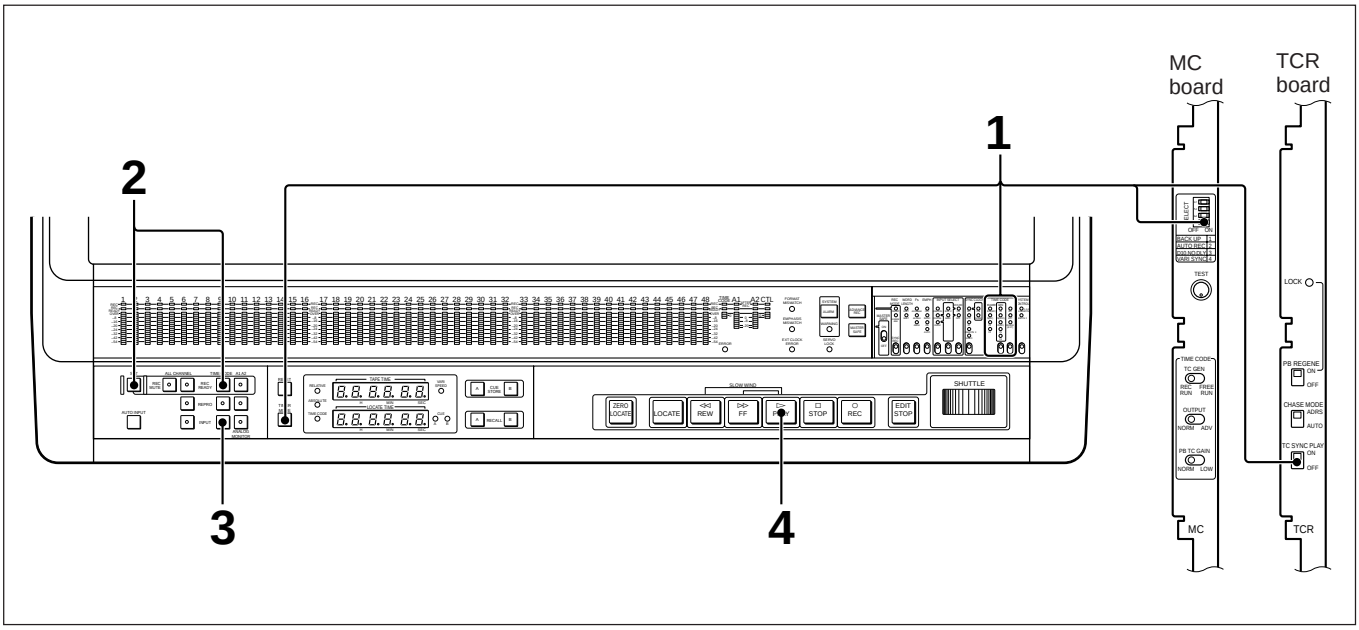
3-7-8 Time Code Sync Playback

Function

This function provides playback with the playback time code phase in sync with an external composite video signal.

Procedure

Use the following procedure for time code sync playback.



Time code sync playback

1 Set the switches as follows.
- TIMER MODE switch: TIME CODE
- SYNC CLOCK switch: VIDEO
- TIME CODE selection switch: INT
- TC SYNC PLAY switch (TCR board): ON
- VARI SYNC switch (MC board): ON or OFF

2 If the TIME CODE REC READY button is lit, holding down the SET button, press the TIME CODE REC READY button to turn it off.

3 Press and light the TIME CODE REPRO button.

4 Press the PLAY button to start playback.

While phase synchronization with the composite video signal is being carried out, the PLAY button flashes. If the VARI SYNC switch is off, you will not be able to hear the playback sound at this point. Once phase synchronization is achieved, the PLAY button changes from flashing to continuously lit, and you will then be able to hear the playback sound.
In order to output the sound during the phase synchronization process, set the VARI SYNC switch to the ON position. Note, however, that if you do this, word clock synchronization on other equipment is canceled.

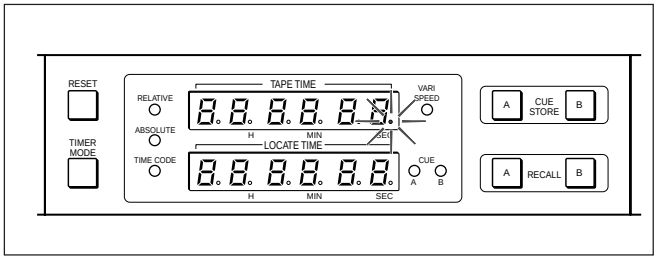
3-7-9 Tape Time Display

This section describes the information displayed on the tape time display while the time code channel is being recorded or played back.

Indication during normal recording and playback

Channel setting	Display
INPUT	Internal time code or external time code
REPRO	Playback time code

If there is no error in the external time code or playback time code, the CTL/time code status lamp lights.

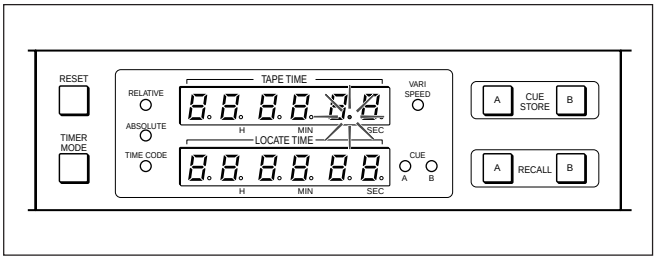


CTL/time code status lamp

Indication during external time code regeneration and playback time code regeneration

Channel setting	Display
INPUT	Internal time code locked to the external time code
REPRO	Internal time code locked to the playback time code

If there is no error in the external time code or playback time code, the regeneration status lamp lights.



Regeneration status lamp

If the regeneration status lamp goes off or starts to flash

While the external time code or playback time code is being regenerated, if at any time it becomes no longer possible to regenerate the time code correctly, the regeneration status lamp, which was on, will go off or start flashing. In this case, the status of the time code depends on which LED of the level meter for the time code channel is lit.

TIME CODE level meter	Time code status
Orange LED is lit.	The input of the external time code or playback time code has stopped.
Green LED is lit.	There are dropout or jump problems in the external time code or playback time code.

3-7-10 Reference Table of Switch Settings for Time Code Recording and Playback

Switch settings for time code recording

		External time code		Internal time code recording
		Through recording	Regenerated recording [a]	
Settings	Monitor mode	REC READY INPUT	REC READY INPUT	REC READY INPUT
	TIMER MODE button	TIME CODE	TIME CODE	TIME CODE
	SYNC CLOCK switch	—	(VIDEO) [a]	(VIDEO) [a]
	TIME CODE GEN switch	—	—	Format being used
	TIME CODE switch	EXT	REGENE (EXT)	INT
	TC GEN switch (MC board)	—	—	REC RUN or FREE RUN
Displays	Tape time display	External time code	Time code from the built-in time code generator	Time code from the built-in time code generator
	Meter display	External time code	Time code from the built-in time code generator	Time code from the built-in time code generator

— : Setting not relevant

a) Set to VIDEO to synchronize to an external composite video signal.

Switch settings for time code playback

			Time code through playback	Regenerated time code playback	Time code sync playback
Settings	Monitor mode		SAFE/REPRO	SAFE/REPRO	SAFE/REPRO
	TIMER MODE button		TIME CODE	TIME CODE	TIME CODE
	SYNC CLOCK switch		—	—	VIDEO
	MC board	VARI SYNC switch	—	—	ON or OFF
	TCR board	PB REGENE switch	OFF	ON	OFF/ (ON) [a]
		PB REGENE LOCK lamp	Off	On	Off/ (On) [a]
		TC SYNC PLAY switch	OFF	OFF	ON
Displays	Tape time display		Playback time code	Time code from the built-in time code generator	Playback time code
	Meter display		Playback time code	Playback time code	Playback time code

—: Setting not relevant

a) When the time code recorded on the tape is synchronized to an external composite video signal, switching the PB REGENE switch on during time code sync playback allows you to perform the playback with a generated time code synchronized to the composite video signal.

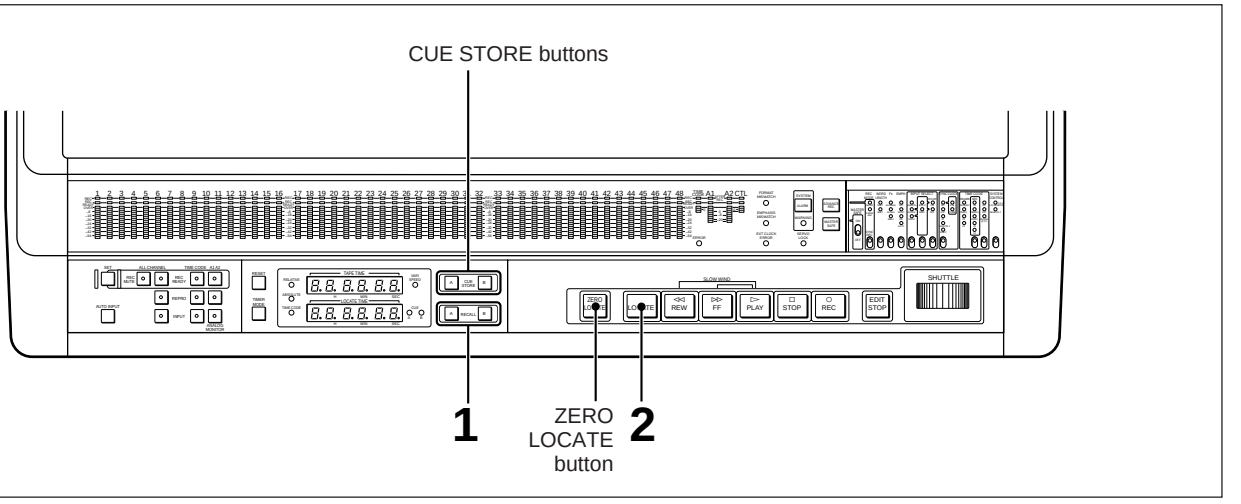
3-8 Locate Operation

Function

The PCM-3348HR has two cue point memories (A and B) that can hold tape time data. You can store the time from the tape time display in a cue point memory, then use it to locate the corresponding position or "00H00MIN00SEC" (zero locate) on the tape.

Procedure

Use the following procedure to carry out a locate operation.



Locate operation

Storing a cue point

Listening to the playback sound, at the required point press either the A or B CUE STORE button.
When you press the CUE STORE button, the tape time point to be stored appears on the locate time display and is stored in the corresponding A or B cue point memory.

Recalling a cue point and locating the tape at it

1 Press either the A or B RECALL button.

When you press the RECALL button, the stored tape time point appears on the locate time display.

2 Press the LOCATE button.

The unit rewinds or fast forwards the tape to the position corresponding to the retrieved tape time point, then stops.

Locating the zero point

Press the ZERO LOCATE button.
The unit rewinds or fast forwards the tape to the "00H00MIN00SEC" point, then stops it.

Automatically playing back from the located point

Use either of the following methods.

- Press the LOCATE or ZERO LOCATE button; then while the locate operation is being carried out, press the PLAY button.
- Press the PLAY button while holding down the LOCATE or ZERO LOCATE button.

Whichever method you use, playback starts automatically when the locate operation is completed.

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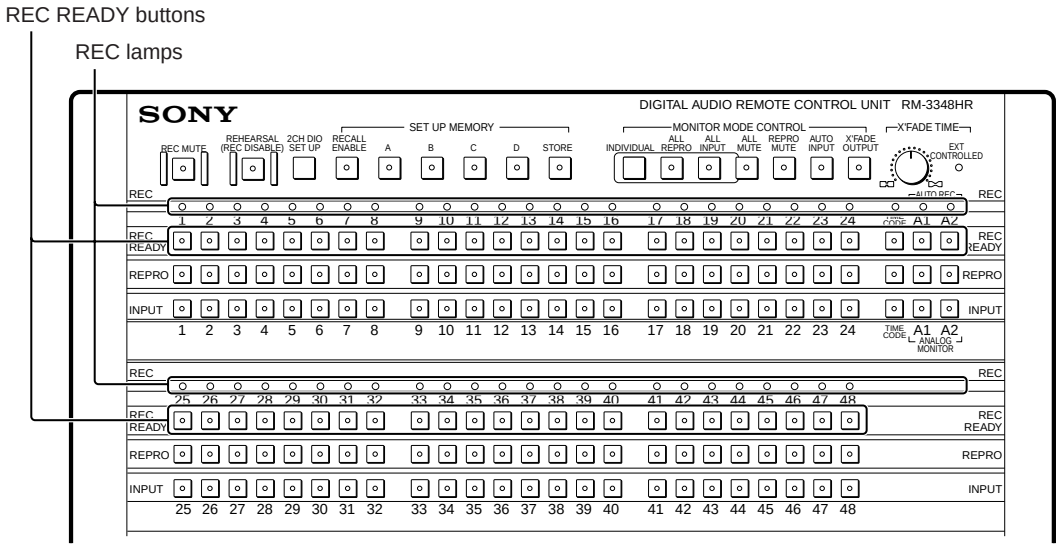
4-1 Audio Control

This section describes audio control operation buttons to control the recording channels, the monitor channels, and so forth.

4-1-1 REC READY Buttons and REC Lamps

The REC READY button for each channel determines whether that channel is in the recording ready state. It also indicates the state of the channel by being off, on or flashing.
During recording, the REC lamps for the channels being recorded light.



REC READY buttons and REC lamps

Using the REC READY buttons

Enabling or inhibiting recording for a particular channel

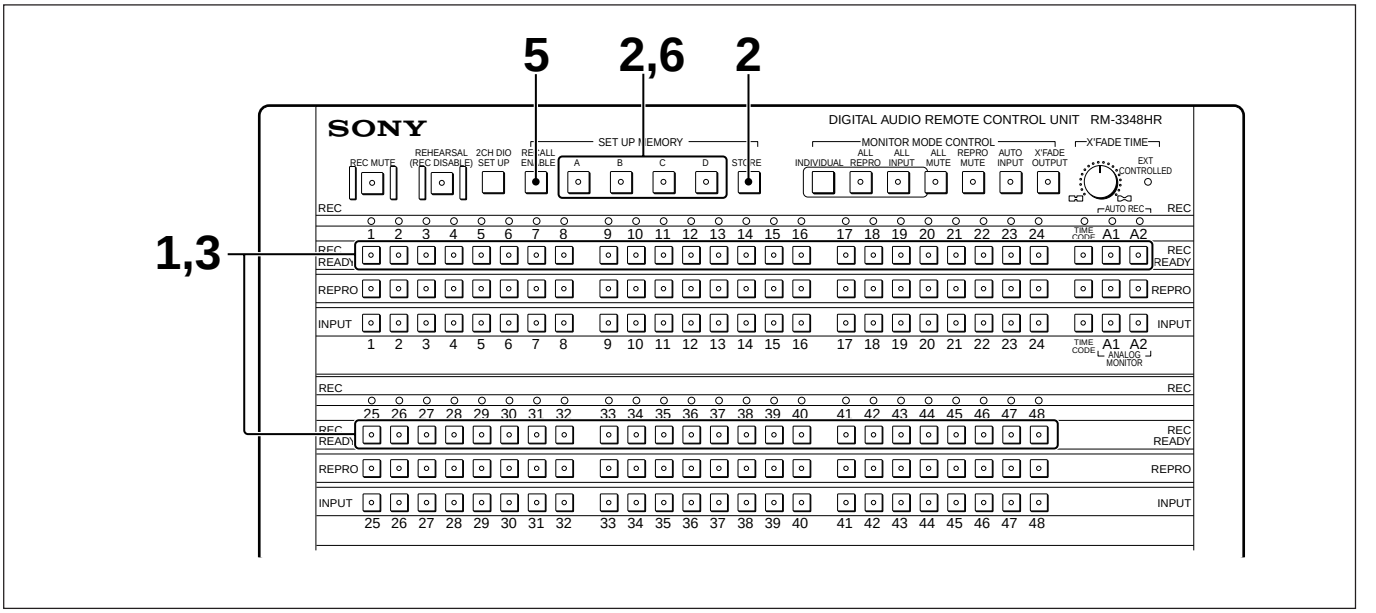
Pressing and lighting the REC READY button for a channel enables "recording ready" for that channel in the recording state.
Press the REC READY button again, turning it off, to inhibit recording on that channel.

Using punch in/out for a particular channel (channel punch in/out function)

During recording (when the REC button and PLAY button are both lit), pressing and lighting the REC READY button for a particular channel allows you to punch in just that channel. Press it again to punch that channel out.
For details on punching in and out, see Section 4-4, "Auto Punch In/Out" (page 4-14).

Punching in several channels simultaneously

The channel setting memory function allows you to punch in a number of channels simultaneously. Use the following procedure to do this.



Punching in several channels simultaneously

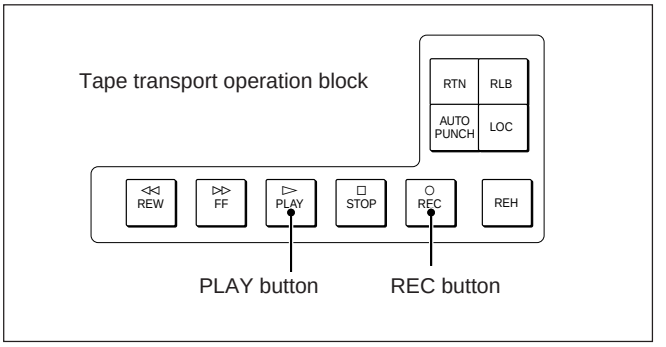
1 Press and light the REC READY buttons for the channels you wish to punch in.

2 In the SET UP MEMORY block, press and light the STORE button, then press one of the A to D buttons, thus saving the channel selection.

3 Press any lit REC READY buttons to turn them off.

This terminates the recording ready state for those channels.

4 Holding down the REC button, press the PLAY button.



The REC button and PLAY button light, and tape transport starts.

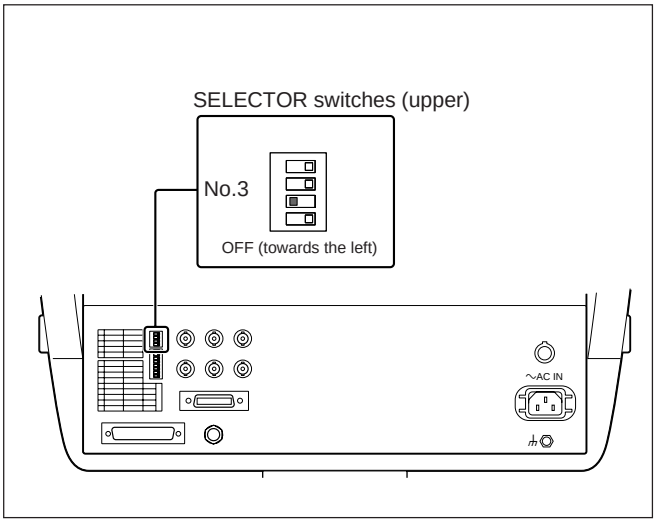
5 Press and light the RECALL ENABLE button in the SET UP MEMORY block.

6 While listening to playback sound, at the position you wish to punch in, press the appropriate A to D button you pressed in step **2**.

This punches in all the channels that were set to the recording ready state.

Inhibiting channel punch in/out

If you press one of the REC READY buttons during recording, this punches in the corresponding channel and starts recording on that channel. To prevent inadvertent punching in, set switch No.3 of the upper set of SELECTOR switches on the rear panel to OFF (REC READY). This setting disables the REC READY buttons during recording. Even with this setting, you can still save channel combinations using the SET UP MEMORY block, and execute channel punch-in/out operations.



Inhibiting channel punch in/out

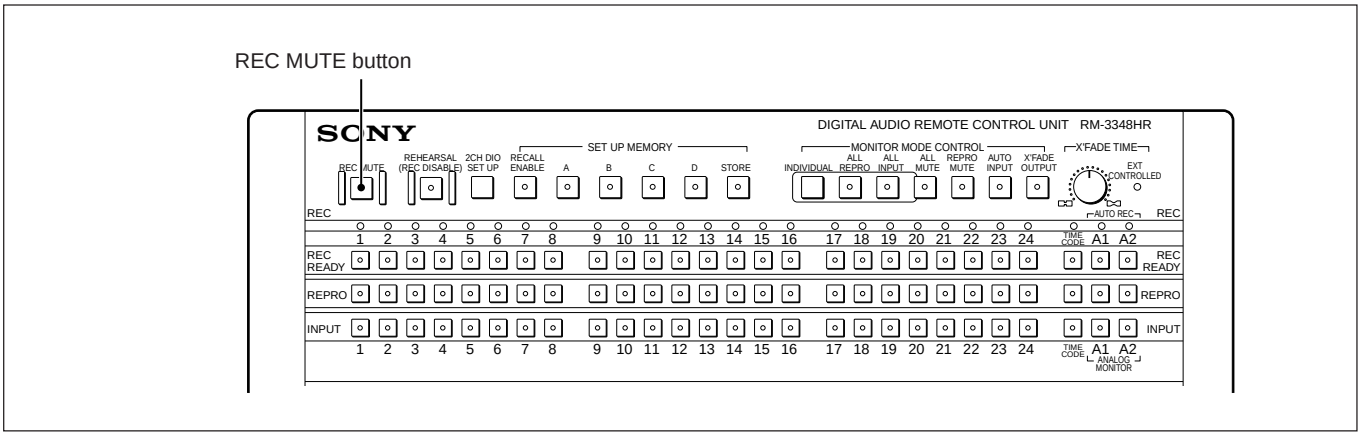
Effect of the REC READY buttons in the sound memory and digital copy functions.

In the sound memory function or digital copy function, the REC READY buttons specify the destination channels for copying. In this case, the REC READY buttons flash to indicate the channels specified as the destinations.

For details on the channel settings for the sound memory function, see Section 5-4-2, "Selecting the Source and Destination Channels" (page 5-7), and for details on the channel settings for the digital copy function, see Section 6-3, "Selecting the Source and Destination Channels" (page 6-3).

4-1-2 Recording Muting Signals on All Digital Audio Channels

Press the REC MUTE button, so that it starts flashing, to set all channels to the muting signal recording state. Press the REC MUTE button again to exit the muting signal recording state.



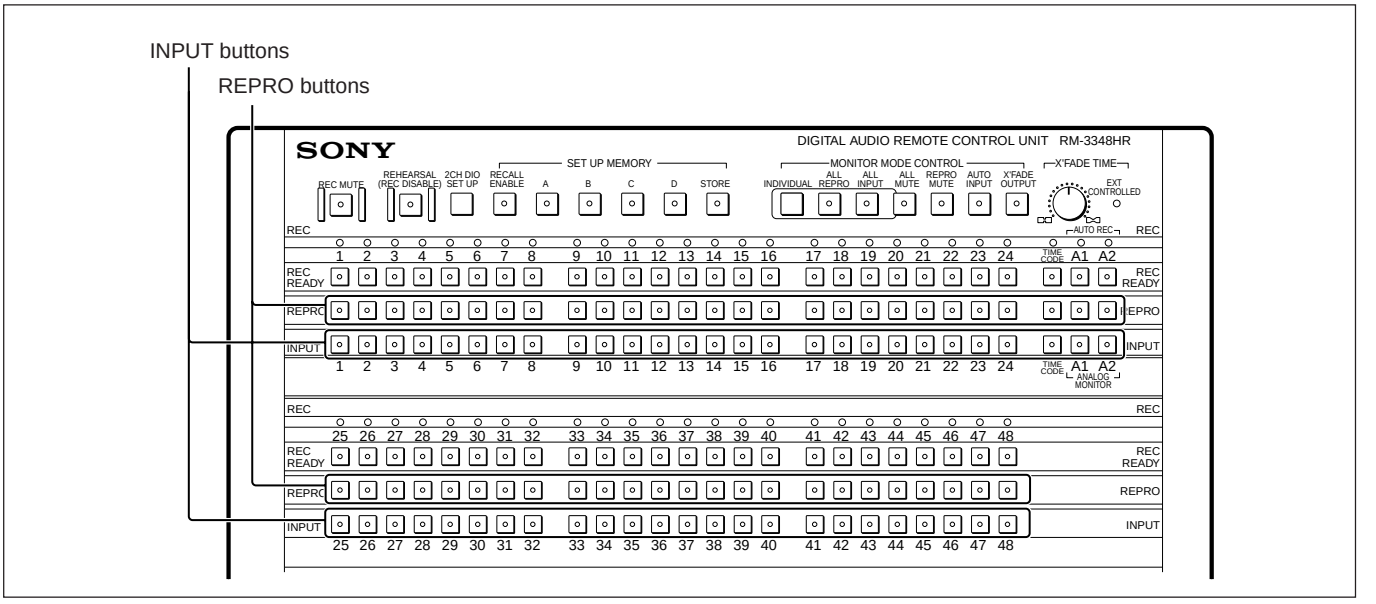
Recording muting signals on all digital audio channels

4-1-3 Switching the Monitor Output

There are three ways of switching the monitor output.

- **Individual settings**
  You can select the monitor output individually for each channel, using the REPRO buttons and INPUT buttons.
- **Using the AUTO INPUT button**
  Pressing and lighting the AUTO INPUT button causes the monitor output to be switched automatically depending on the tape transport state.
- **Using the MONITOR MODE CONTROL buttons**
  Using the ALL REPRO and ALL INPUT buttons, you can select the playback signal or input signal for all digital audio channels together.

Individual settings



Individual settings

REPRO button

Press and light the REPRO button for a certain channel to set the channel to the playback signal monitoring state.
When the ALL MUTE button or REPRO MUTE button is lit, the REPRO button for each channel is still active, but does not light.

INPUT button

Press and light the INPUT button for a channel to set that channel to the input signal monitoring state.
When the ALL MUTE button is lit, the INPUT button for each channel is still active, but does not light.

Conditions where both the REPRO and INPUT buttons light simultaneously

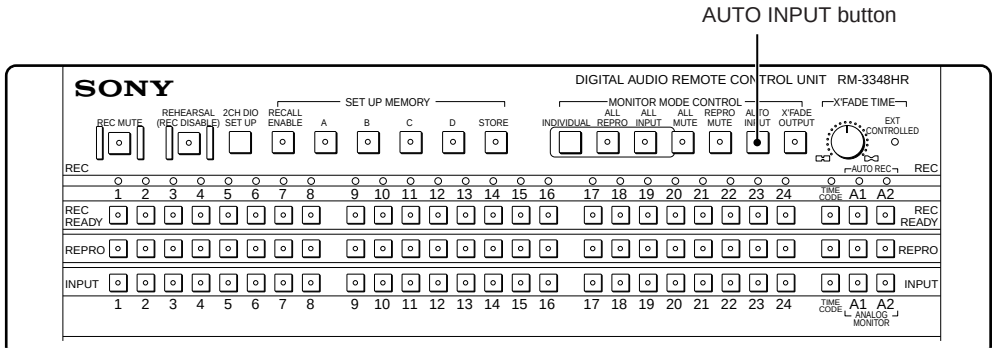
If all the conditions below hold, both the REPRO INPUT buttons for a channel will be lit. In this case, the monitor output is the input signal.

- When the recording mode is "assemble recording" or "insert recording."
- When the tape transport state is "recording" or "rehearsal."
- When the REC READY and REPRO buttons for the channel are both turned on.

Effect of the REPRO buttons and INPUT buttons in the sound memory and digital copy functions

In the sound memory function or digital copy function, the REPRO buttons and INPUT buttons specify the source channels for copying.
In this case, the REPRO buttons and INPUT buttons flash to indicate the channels specified as the source.
For details on the channel settings for the sound memory function, see Section 5-4-2, "Selecting the Source and Destination Channels" (page 5-7), and for details on the channel settings for the digital copy function, see Section 6-3, "Selecting the Source and Destination Channels" (page 6-3).

Using the AUTO INPUT button



Using the AUTO INPUT button

The RM-3348HR provides two modes for automatically switching the monitor output with the AUTO INPUT button.

- **Switching all channels automatically**
  The monitor output for all channels except the time code channel is switched automatically depending on the tape transport state, regardless of whether a particular channel is in the recording ready state or not.

- **Switching only recording ready channels automatically**
  The monitor output for only those channels which are in the recording ready state is switched automatically, depending on the tape transport state.

For details on the relationship between the tape transport state and the monitor output, see "Switching the monitor output automatically, depending on the tape transport state (page 3-2)."

Selecting the mode to switch all channels automatically

Press the 1, STORE, =, and 6 buttons in that order, then press the AUTO INPUT button.
The indication "ALL CH" appears on the LOCATE TIME display, and the mode to switch all channels automatically is selected.

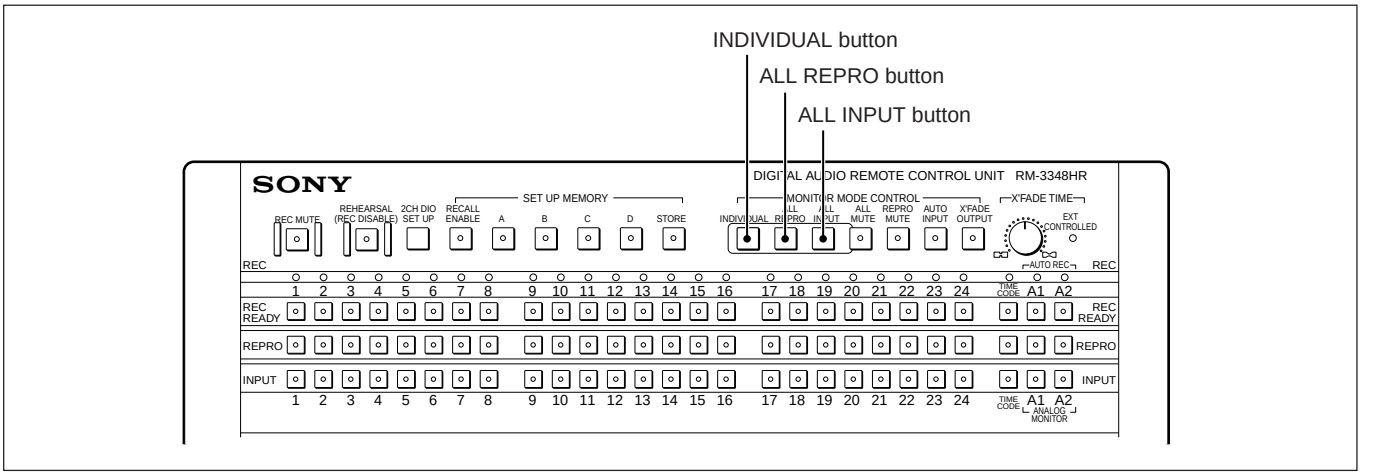
Selecting the mode to switch only recording-ready channels automatically

Press the 0, STORE, =, and 6 buttons in that order; then press the AUTO INPUT button.
The indication "RDY CH" appears on the LOCATE TIME display, and the mode to switch only recording ready channels automatically is selected.

Checking the currently selected mode

Press the RECALL, =, and 6 buttons in that order.
The current mode is displayed on the LOCATE TIME display.

Using the MONITOR MODE CONTROL buttons



Using the MONITOR MODE CONTROL buttons

ALL REPRO button

Press and light the ALL REPRO button to set all digital audio channels to the playback signal monitoring state. Unless in the ALL MUTE or REPRO MUTE state, the REPRO buttons for all digital audio channels light.

This state ends and the ALL REPRO button goes off in the following cases. The channels normally revert to their individual settings.

- When the AUTO INPUT button is pressed.
- When the ALL INPUT button is pressed.
- When the INDIVIDUAL button is pressed.
- When the REPRO button or INPUT button for a channel is pressed.
- When the tape transport state automatically changes while the AUTO INPUT button is lit.
- When the channel settings are retrieved using one of the SET UP MEMORY buttons A to D.

ALL INPUT button

Press and light the ALL INPUT button to set all digital audio channels to the input signal monitoring state. Unless in the ALL MUTE state, the INPUT buttons for all digital audio channels light.

This state ends and the ALL INPUT button goes off in the following cases. The channels normally revert to their individual settings.

- When the AUTO INPUT button is pressed.
- When the ALL REPRO button is pressed.
- When the INDIVIDUAL button is pressed.
- When the REPRO button or INPUT button for a channel is pressed.
- When the tape transport state automatically changes while the AUTO INPUT button is lit.
- When the channel settings are retrieved using one of the SET UP MEMORY buttons A to D.

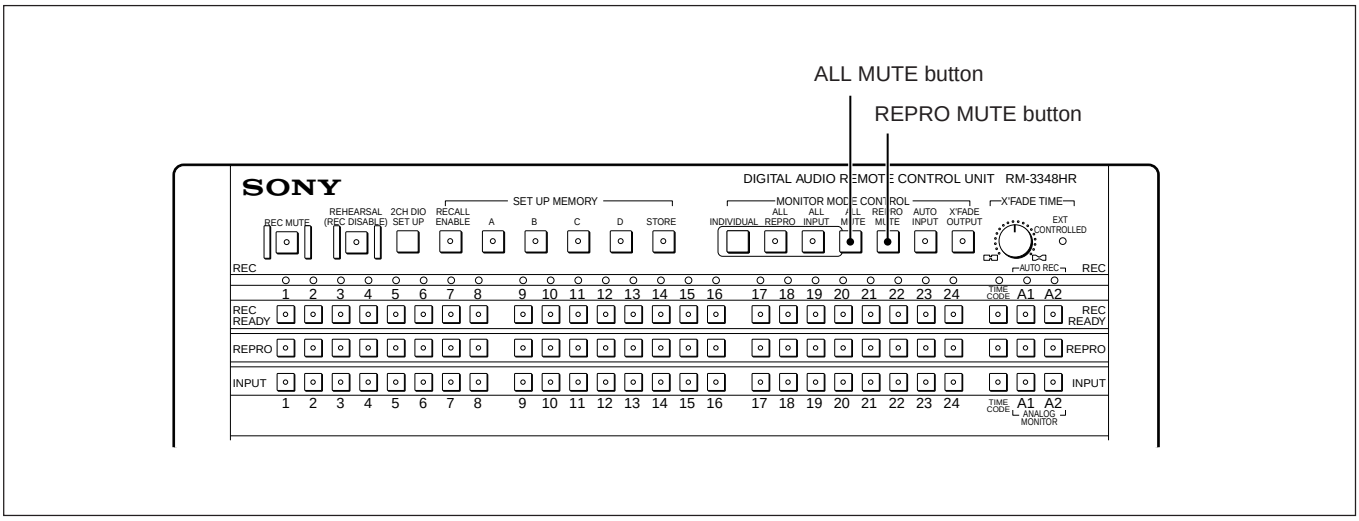
Reverting to the individual settings

To return to the previous individual settings for the channels when the ALL REPRO or ALL INPUT button is lit, press the INDIVIDUAL button.

4-1-4 Muting the Monitor Signal

There are two methods for muting the monitor signal for all digital audio channels.

- Muting all monitor outputs regardless of whether input or playback.
- Muting only the playback monitor outputs.



Muting the monitor signal

Muting the monitor output from all channels

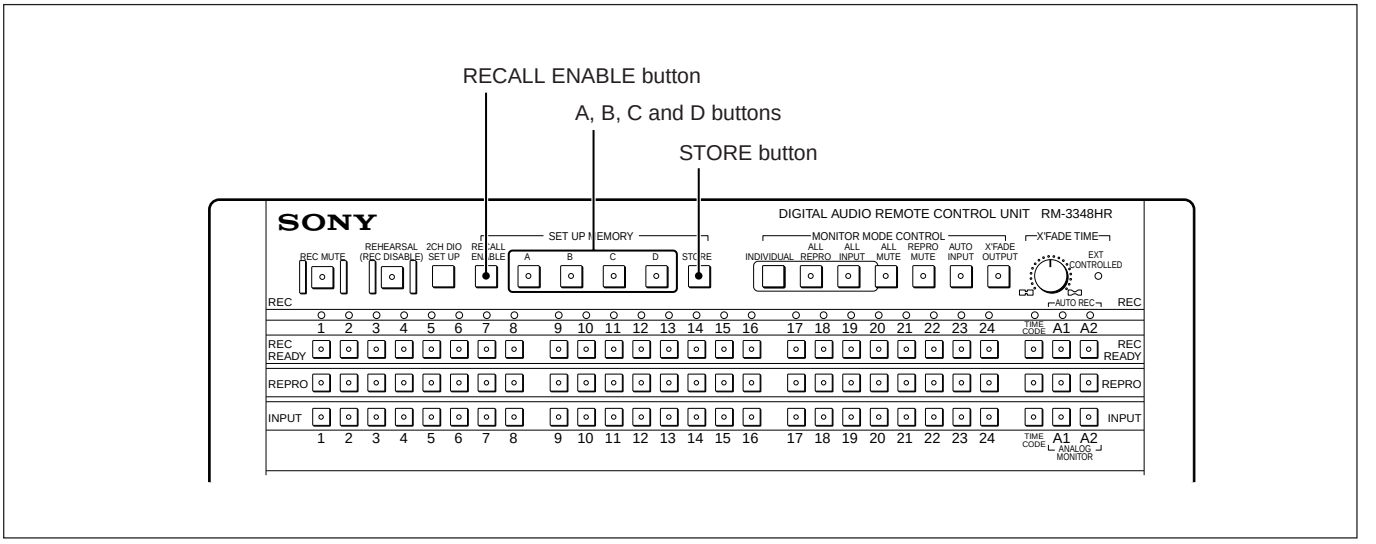
Press and light the ALL MUTE button.
The REPRO buttons and INPUT buttons for all digital audio channels go off, and the monitor signal for all digital audio channels set in the REPRO or INPUT state is muted.
To exit the muted state, press the ALL MUTE button again to turn it off.

Muting only the playback monitor outputs

Use the REPRO MUTE button, which is only active when the tape transport is not in the recording state. Pressing and lighting the REPRO MUTE button causes the lit buttons for those channels to go off, and the playback monitor signal for all those digital audio channels is muted.
To exit the muted state, press the REPRO MUTE button again, turning it off. Alternatively, pressing the REC button and PLAY button to switch to the recording state also releases the REPRO MUTE state.

4-1-5 Channel Setting Memory

You can save and recall channel settings using the SET UP MEMORY buttons A to D.
It is not possible, however, to save the ALL MUTE and REPRO MUTE settings.



Channel setting memory

Saving the channel settings

1 Set all the digital audio channels to the required state.

2 Press and light the STORE button.

3 Press one of the A to D buttons.

This saves the channel settings in memory corresponding to the button pressed.

Recalling the channel settings

1 Press and light the RECALL ENABLE button.

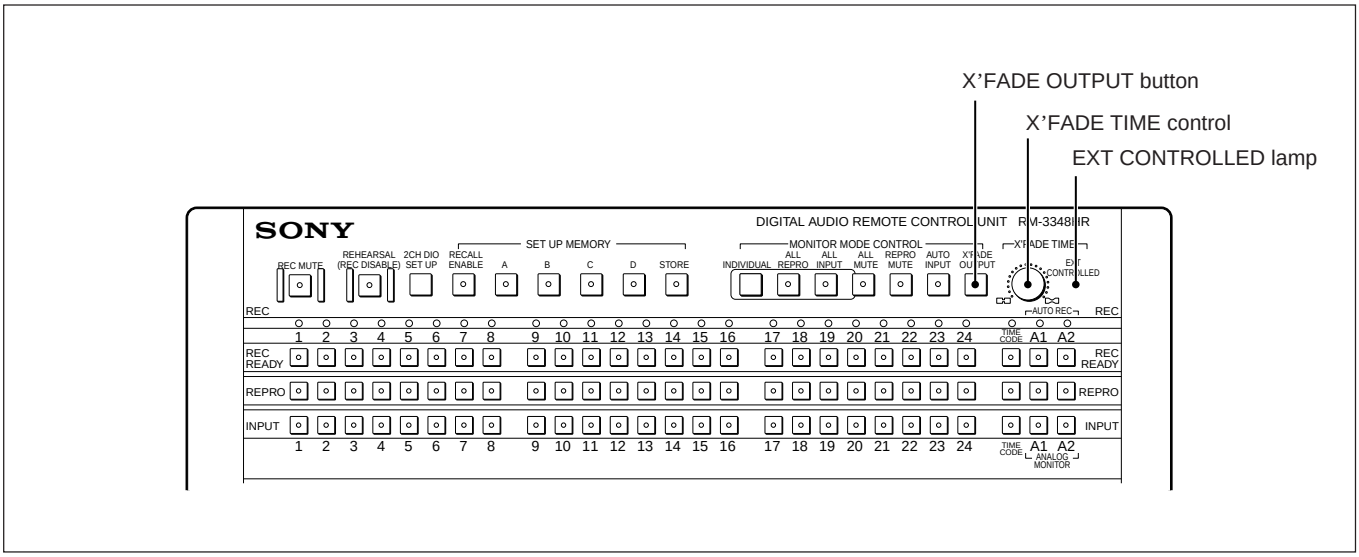
2 Press one of the A to D buttons.

The RECALL ENABLE button remains on once pressed. To recall a different setting, simply press another one of the A to D buttons.

Turning the RECALL ENABLE button off

Press the RECALL ENABLE button again to turn it off, rendering the A to D buttons inactive.

4-2 Setting the Cross Fade Time



Setting the cross fader time

Setting the cross fade time

Use the X'FADE TIME control to set the cross fade time.

There are 16 setting levels, indicated as 1 to 16; the longest cross fade time corresponds to a setting of 16.

Checking the cross fade time setting

Press the RECALL, =, and 1 buttons in that order.

The current setting of the cross fade time is displayed on the LOCATE TIME display.

The table to the right shows the relationship between the 16 setting levels, the values displayed and the precise time intervals.

EXT CONTROLLED lamp

This lamp lights when the cross fade time is controlled by APIB commands from external equipment connected to the IEEE Std 488-1978 connector on the rear panel of the RM-3348HR.

X'FADE TIME control settings and cross fade time

X'FADE TIME setting level	LOCATE TIME indication	Cross fade times (in milliseconds)		
		Fs = 44.056 kHz	Fs = 44.1 kHz	Fs = 48.0 kHz
1	1	1.5	1.5	1.4
2	3	2.8	2.8	2.6
3	5	5.7	5.6	5.2
4	10	11.3	11.3	10.4
5	20	23.2	23.2	21.3
6	25	26.6	26.6	24.4
7	30	31.0	31.0	28.5
8	35	37.2	37.2	34.1
9	40	46.5	46.4	42.7
10	50	53.1	53.1	48.8
11	60	62.0	61.9	56.9
12	70	74.4	74.3	68.3
13	90	93.0	92.9	85.3
14	120	124.0	123.9	113.8
15	200	185.9	185.8	170.7
16	350	371.9	371.5	341.3

Fs: Sampling frequency

Factory setting: Level 1

Monitoring the cross fade sound during sync recording

The X'FADE OUTPUT button selects the monitor signal output during sync recording.
Pressing the X'FADE OUTPUT button toggles it on and off.

When the X'FADE OUTPUT button is on

The monitor output signal switches between the recording and playback signals exactly as recorded on the tape. This enables you to check the cross fade effect, for example after changing the cross fade time. There is, however, a very slight delay between the input signal and the playback monitor signal, which is due to the A/D and D/A conversions.

When the X'FADE OUTPUT button is off

There is no delay between the input signal and the playback monitor signal. This is convenient when dubbing over an existing recording.
In this case, the cross fade time used for recording is set using the X'FADE TIME control, but this cross fade time is not apparent on the monitor signal.
When using a digital audio input signal, the sound memory function, or the digital copy function, however, this mode is not active, and the monitor signal always includes the digital cross fade effect.

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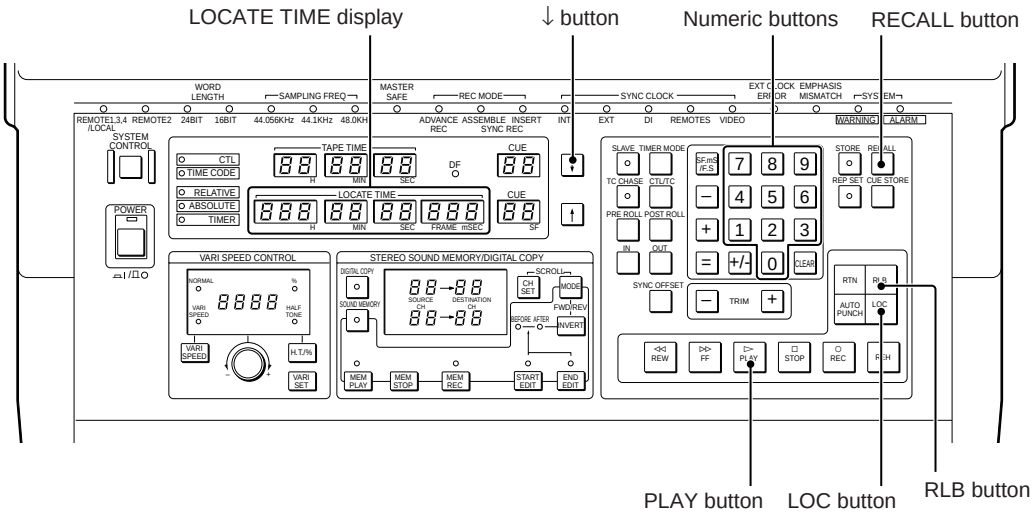
4-3 Tape Transport Operations

Use the following buttons and display for "Locate and Roll-back operation" operating.



4-3-1 Locate Operation

Function

This operation uses rewind or fast forward to transport the tape to a desired position, and stops it there.

Procedure

1 Use any of the following methods to display the time value for the target position on the LOCATE TIME display.

- Enter the value directly using the numeric buttons.
- Listen to the playback signal, and press the ↓ button at the desired point.
- Recall a time value saved in a register.

For details on how to display a time in the LOCATE TIME display, see the paragraph "Displaying a time value on the LOCATE TIME display" (page 4-23) and for details of retrieving values from registers, see Section 4-6-3, "Using Registers to Save and Retrieve Time Values" (page 4-24).

2 Press the LOC button.

The tape rewinds or fast-forwards to the specified position, and stops.

Automatic start of playback from the located position

Use either of the following methods.

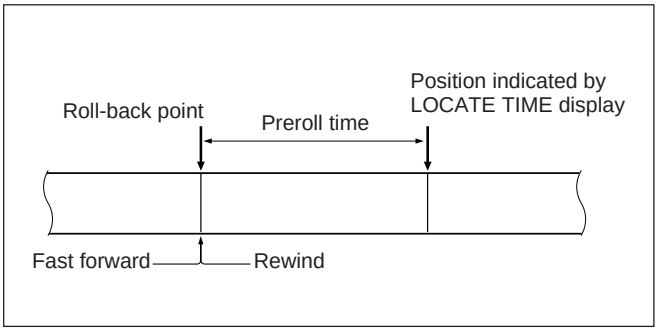
- Press the LOC button, then while the locate operation is in progress, press the PLAY button.
- Press the PLAY button while holding down the LOC button.

In either case, when the locate operation completes, the unit automatically switches to playback.

4-3-2 Roll-Back Operation

Function

This function uses rewind or fast forward to position the tape to a particular position by exactly the preroll time.
The preroll time is the value saved in the preroll time register, which is used to begin tape playback a short time before a particular position.
The factory setting for the preroll time is 8 seconds.



Roll-back operation

Procedure

1 Use any of the following methods to set the time value for the target position on the LOCATE TIME display.
- Enter the value directly using the numeric buttons.
- Listen to the playback signal, and press the ↓ button at the desired point.
- Recall a time value saved in a register.

For details on how to display a time on the LOCATE TIME display, see the section "Displaying a time value on the LOCATE TIME display" (page 4-23) and for details on retrieving values from registers, see Section 4-6-3, "Using Registers to Save to Retrieve Time Values" (page 4-24).

2 Press the RLB button.

The tape rewinds or fast-forwards to a position before the position in the LOCATE TIME display by exactly the preroll time, and stops.

Note

If subtracting the preroll time from the target position, the time value becomes negative, the indication "ILLG" appears on the LOCATE TIME display, and the roll-back operation is not carried out.

Selecting automatic playback from the preroll position

Use either of the following methods.
- Press the RLB button; then while the roll-back operation is in progress, press the PLAY button.
- Press the PLAY button while holding down the RLB button.

In either case, the unit automatically switches to playback when the roll-back operation has completed.

4-3-3 Return Playback and Repeat Playback

Function

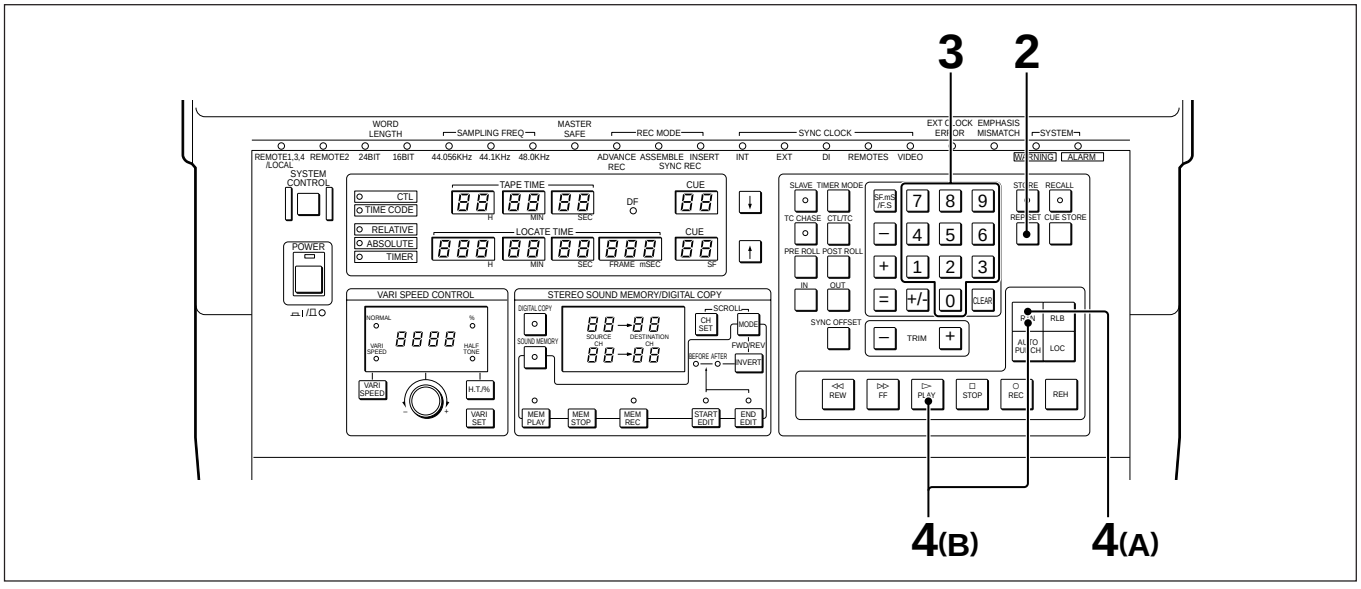
- **Return playback**
  After playback between two specified points, the tape rewinds to the playback start point, and stops.
- **Repeat playback**
  Playback between two specified points is repeated indefinitely.

Note

There must be a minimum of one second between the start point and the finish point.

Procedure

Use the following procedure to carry out return playback or repeat playback.



1 Save the start and end points in cue point registers.
For details on saving time values in cue point registers, see Section 4-6-3, "Using Registers to Save and Retrieve Time Values" (page 4-24).

2 Press and light the REP SET button.

3 Use the numeric buttons to enter in turn the numbers of the cue point registers to hold the start and end times.

When using up to 10 cue point registers, these are single-digit numbers, and when using up to 100 cue point registers, these are two-digit numbers.
For details on selecting the number of cue point registers, see Section 4-6-4, "Selecting the Number of Cue Point Registers" (page 4-25).

4 **(A) For return playback**
Press the RTN button.
(B) For repeat playback
While holding down the RTN button, press the PLAY button.

Changing the end point while return or repeat playback is in progress

Change the number of the end point cue point register, using the procedure in step **3** above, or change the contents of that cue point register, then execute step **4**.
Playback continues up to the new end point, then the tape rewinds to the start point.
Repeat playback continues playback between the start point and the new end point.

4-4 Auto Punch In/Out

Function

Using two specified points (the punch-in point and punch-out point), you can automatically carry out rehearsal or recording.
For dubbing over an existing recording, you can use this for repeated recording over the same interval.

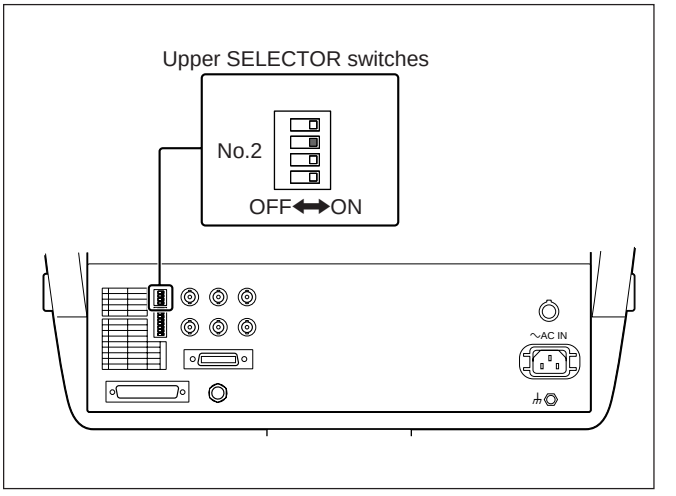
There are two modes for auto punch in/out, with different methods of specifying the preroll time.

- **Direct auto punch-in/out mode**
  In this mode, press the AUTO PUNCH button before the punch in point, and the point at which this button is pressed becomes the preroll point for the auto punch in/out operation.
- **Preroll auto punch-in/out mode**
  In this mode, the preroll time saved in the preroll time register is used to determine the preroll point for the auto punch in/out operation.

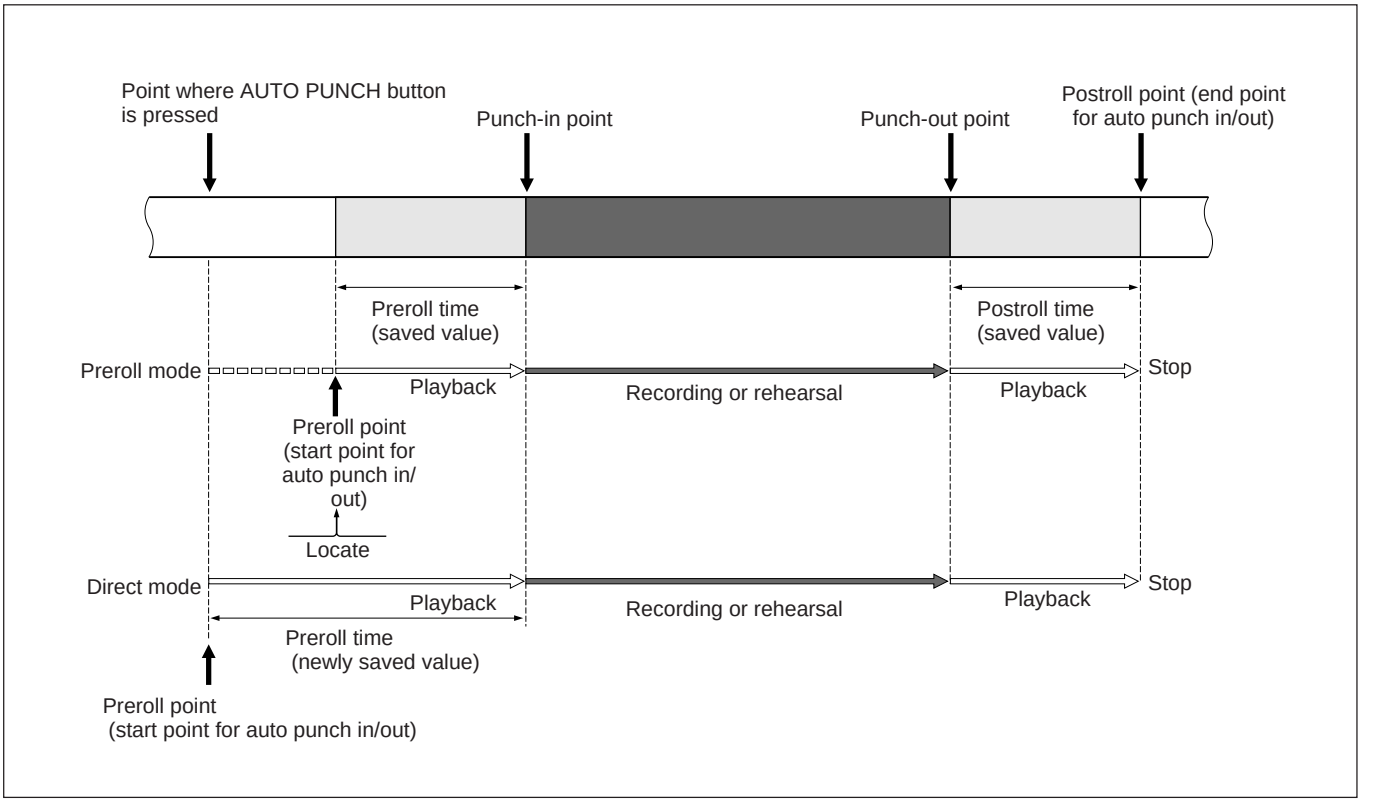
Preparation

Select the mode using switch No. 2 of the upper set of SELECTOR switches on the rear panel of the RM-3348HR.

- For direct auto punch-in/out mode: set to OFF (A. PUNCH).
- For preroll auto punch-in/out mode: set to ON (NORM).



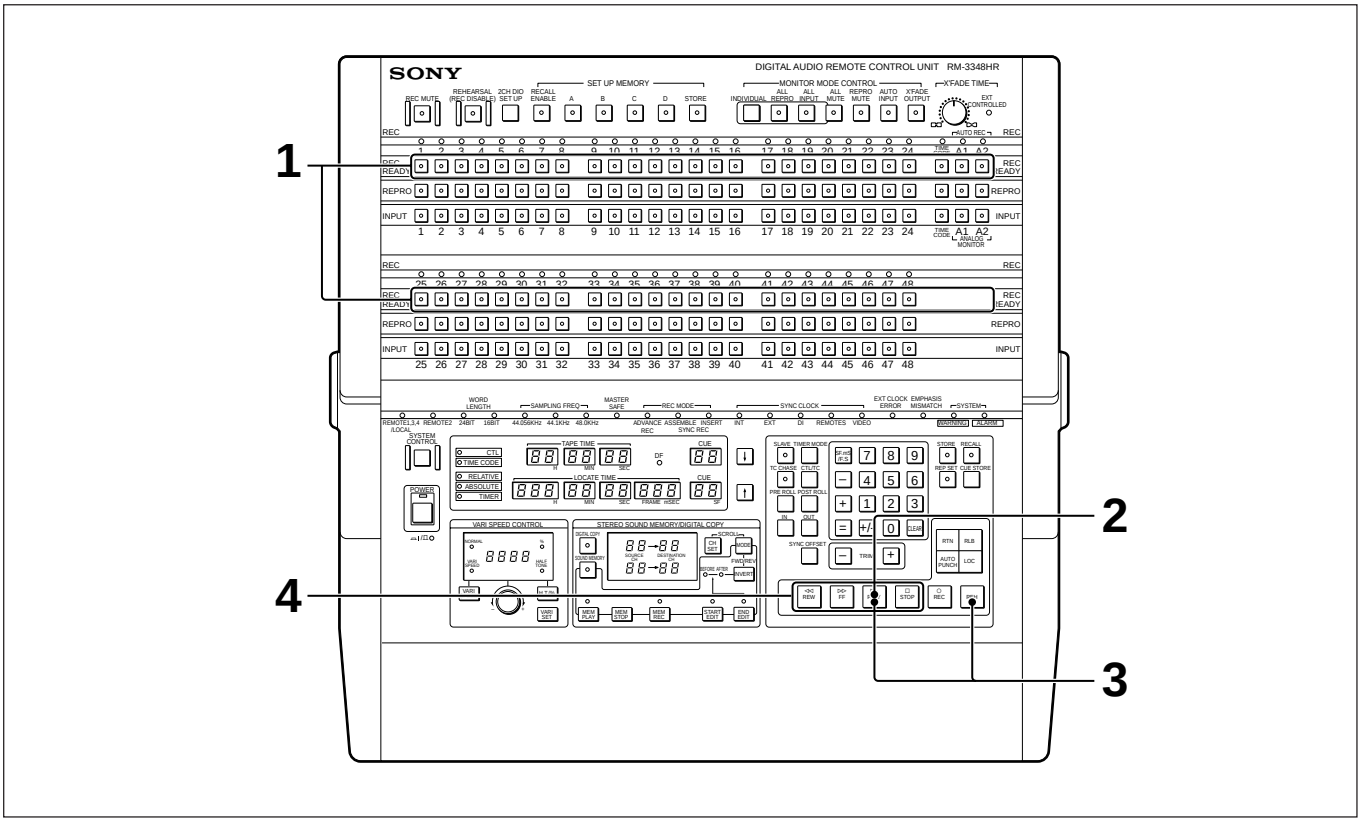
Selecting the auto punch-in/out mode



Auto punch in/out

4-4-1 Saving Punch-In/Out Points During Rehearsal or Recording

Use the following procedure to save punch-in/out points.



Saving punch-in/out points during rehearsal or recording

1 Set the channels for auto punch in/out to the recording ready state.

2 Press and light the PLAY button to start playback.

3 At the point where you wish to start recording, hold down the PLAY button, and press the REH button.

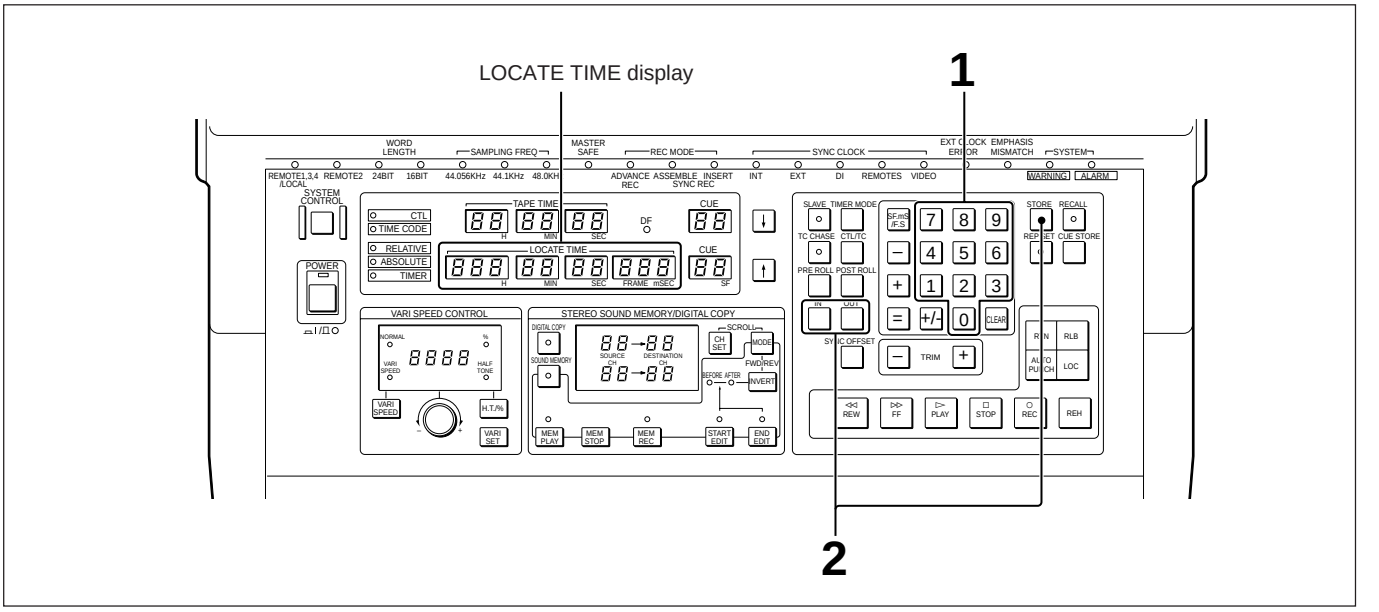
The REH button lights, and the point at which the button was pressed is stored in the IN-point register.
At this point, the monitor output signal cross-fades from the playback signal to the input signal.

4 At the recording end point, press any tape transport operation button (PLAY, FF, REW or STOP).

The REH button goes off, and the point is saved in the OUT point register.
At the same point the monitor output signal cross-fades back from the input signal to the playback signal.

In step **3**, if you hold down the REC button and press the PLAY button, recording begins, and the point at which the REC button was pressed is stored in the IN point register. Pressing any tape transport operation button (PLAY, FF, REW or STOP) stops the recording, and saves the end point in the OUT-point register.

4-4-2 Saving Time Values Directly in the IN and OUT Point Registers



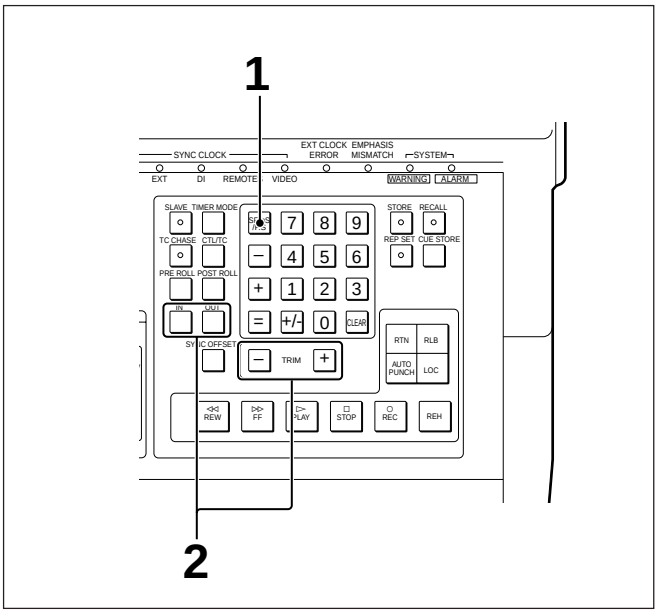
Saving time values directly in the IN-and OUT-point registers

1 Enter the desired time value on the LOCATE TIME display using the numeric buttons.

2 Press and light the STORE button, then press the IN button or OUT button.

This saves the time value in the IN-point register or OUT-point register respectively.

4-4-3 Correcting the Punch-In/Out Points



Correcting the punch-in/out points

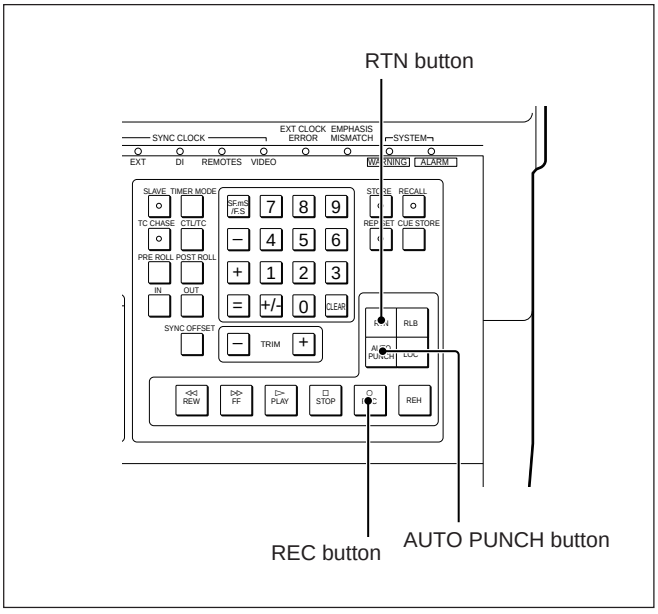
For large corrections, simply recall the time values for the IN/OUT-point registers and correct them using the numeric buttons, but for corrections in millisecond units, use the following procedure.

1 Set the LOCATE TIME display to the millisecond mode using the SF.mS/F.S button.

2 Holding down the IN or OUT button, press the + or –TRIM button to correct the value.

This makes corrections of 1 millisecond in the punch-in/out point. After correction, the new time value is automatically saved in the same register.

4-4-4 Executing Auto Punch In/Out



Executing auto punch in/out

Rehearsal using auto punch in/out

Press the AUTO PUNCH button.

Playback begins from the preroll point, and between the punch-in point and punch-out point the rehearsal is carried out, whereupon the tape stops at the postroll point. The LOCATE TIME display shows the time value for the punch-in point.

Carrying out a repeated rehearsal

Holding down the AUTO PUNCH button, press the RTN button.

Both the buttons light, and the tape repeatedly travels between the preroll and postroll points, repeating the rehearsal between the punch-in and punch-out points.

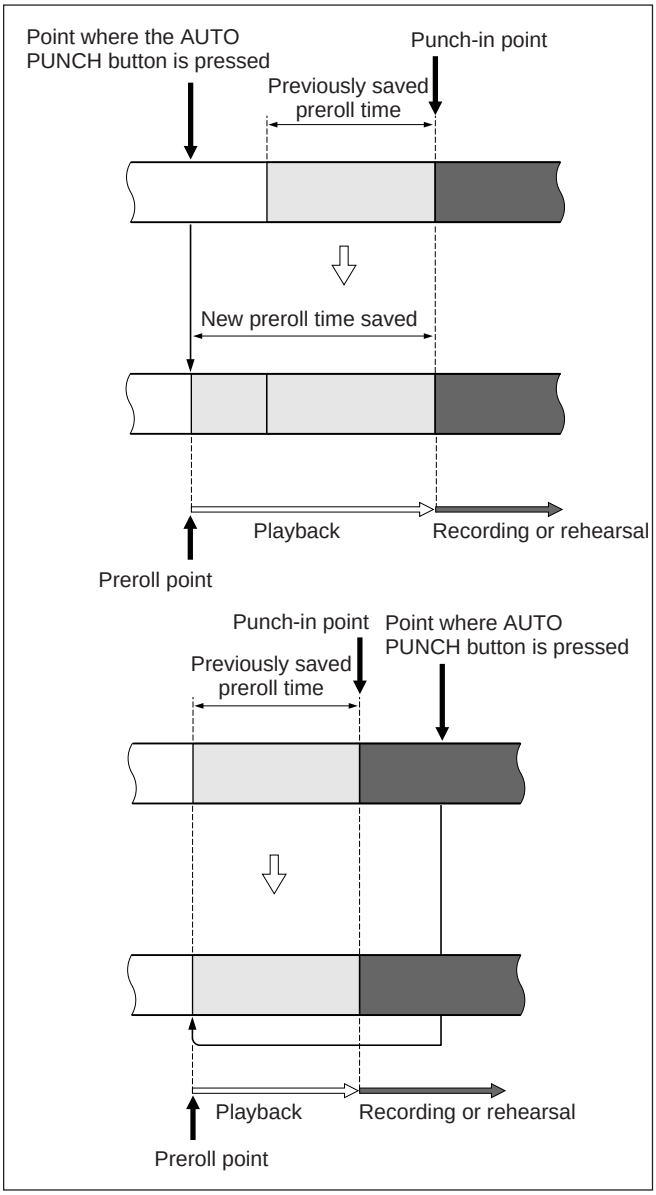
Recording using auto punch in/out

Holding down the AUTO PUNCH button, press the REC button.

Playback begins from the preroll point, and between the punch in point and punch out point the recording is carried out, whereupon the tape stops at the postroll point. The LOCATE TIME display shows the time value for the punch-in point.

Preroll point for direct auto punch-in/out mode

- If the point where the AUTO PUNCH button was pressed is before the punch-in point, the point at which this button is pressed becomes the preroll point.
  The preroll time determined by this operation is saved as the new value in the preroll time register.
- If the point where the AUTO PUNCH button was pressed is after the punch-in point, the existing value in the preroll time register is used to determine the point to start playback.



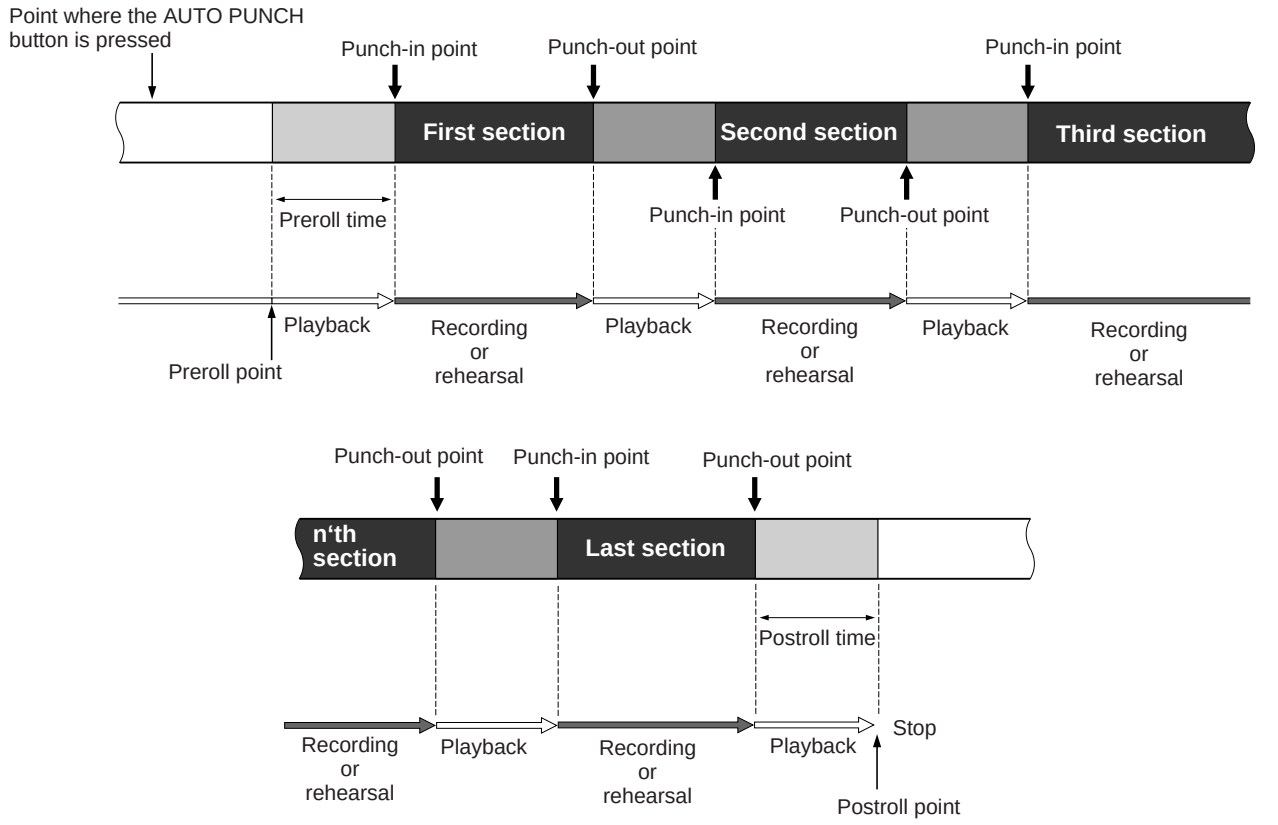
Preroll point for direct auto punch-in/out mode

Preroll point for preroll auto punch-in/out mode

Regardless of the position where the AUTO PUNCH button is pressed, the existing value in the preroll time register is used to determine the point to start playback.

4-5 Continuous Auto Punch In/Out

Continuous auto punch-in/out mode enables you to store punch-in and punch-out points in each of nine pairs (1 to 9) of the IN/OUT point registers and execute auto punch in/out of multiple sections (max. 9 sections).
Playback begins from the preroll point for the first section (with the earliest punch-in point in time sequence), and between the punch-in point and punch-out point, rehearsal or recording is carried out. When rehearsal or recording of the first section is completed, the tape is played back up to the punch-in point of the next section. When rehearsal or recording of the last section is completed, the tape stops at the postroll point for the last section.

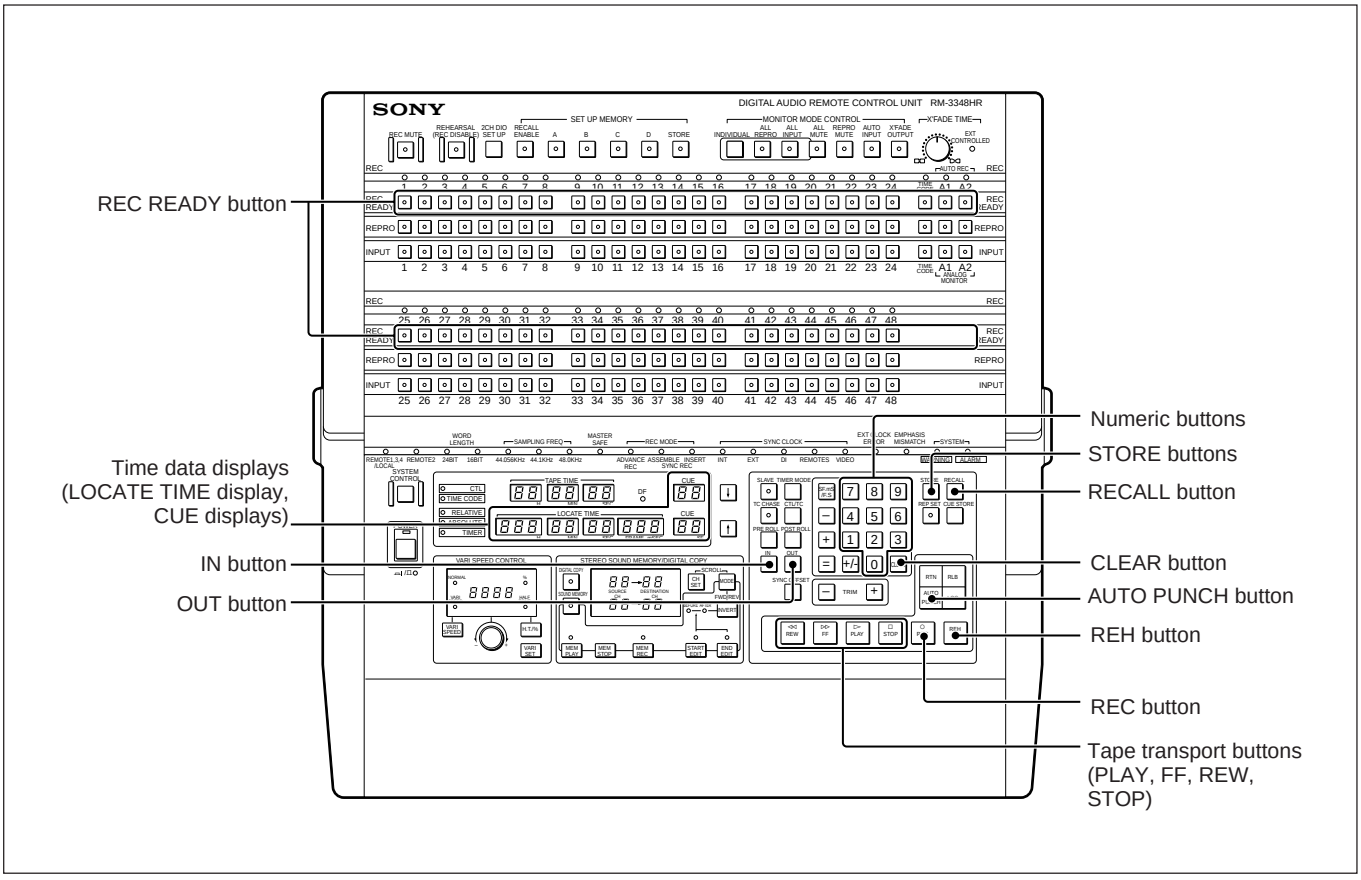


Continuous auto punch in/out

Notes

- In continuous auto punch in/out mode, punch in/out of the specified sections is executed in time sequence, regardless of the register number.
  Playback is executed from the punch-out point of one section to the punch-in point of the next section.
- You cannot specify two sections that overlap each other in time. If you specify a section that overlaps already specified sections, an error message is displayed.
- In auto punch-in/out mode, some of the cue point registers are used for IN/OUT-point registers.
  When the maximum number of cue-point registers is set to 10 (10 CUE), cue point registers 1 to 9 are used as IN/OUT-point registers 1 to 9.
  When the maximum number of cue point registers is set to 100(100 CUE), cue-point registers 01 to 09 are used as IN/OUT-point registers 1 to 9.
  Thus, for normal cue-point registers when the unit is in continuous auto punch mode, only cue point register 0 can be used with a 10(10 CUE) setting, and only cue-point registers 0 and 10 to 99 can be used with a 100(100 CUE) setting.
  For setting the maximum number of cue point registers, see Section 4-6-4, "Selecting the Number of Cue Point Registers" (page 4-25).

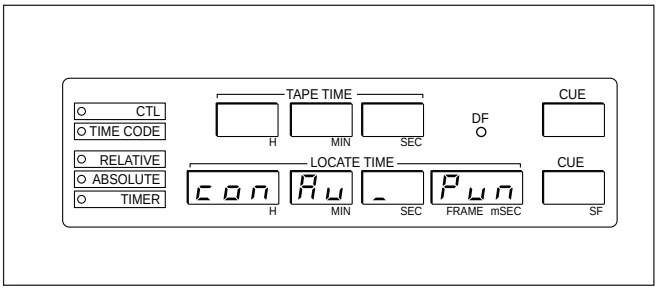
The following buttons and displays are used for operations in auto punch mode.



4-5-1 Selecting Continuous Auto Punch Mode

Setting the unit in continuous auto punch mode

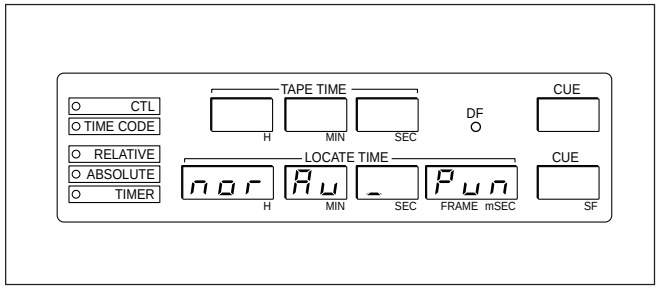
Press the 1, STORE, = and 2 buttons in that order. The unit enters continuous auto punch mode and "con Au _ Pun" appears on the LOCATE TIME display.



If there are some registers in which IN and OUT points have already been saved, the earliest of the saved IN points is displayed after "con Au_Pun" is displayed for one second.

To release continuous auto punch mode

Press the 0, STORE, = and 2 buttons in that order. Continuous auto punch mode is canceled and "nor Au _ Pun" appears on the LOCATE TIME display.



4-5-2 Saving Punch-In/Out Points in Continuous Auto Punch Mode

Saving punch-in/out points during rehearsal or recording

In continuous auto punch mode, the punch-in/out points are saved in IN/OUT-point register pairs 1 through 9 in numerical order.

Note

If there are some register pairs in which IN and OUT points have already been saved, saving is executed from the pair of the lowest number among those in which IN/OUT points have not yet been saved.

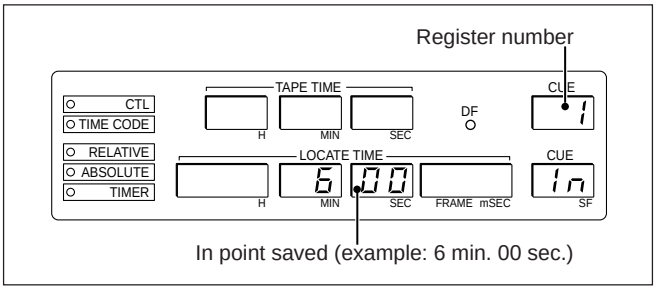
Procedure

1 Set the channels for auto punch in/out to the recording ready state.

2 Press and light the PLAY button to start playback.

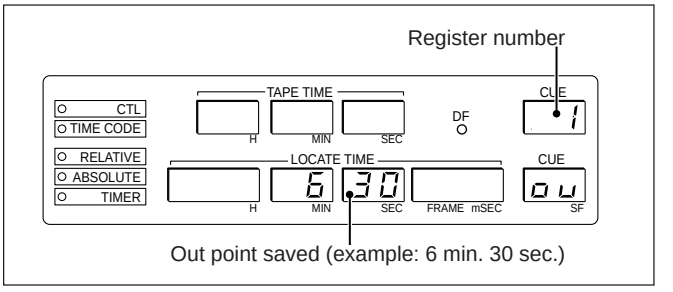
3 At the point where you wish to start recording, hold down the PLAY button, and press the REH or REC button.

The REH or REC button lights, and the point at which the button was pressed is stored in the IN-point register which has the smallest number among those in which an IN point has not yet been saved, and displayed on the time data display as follows.



4 At the recording end point, press any tape transport operation button (PLAY, FF, REW or STOP).

The REH or REC button goes off, and the point is saved in the OUT-point register and displayed as follows .



Repeat steps **1** through **4** to save up to IN/OUT registers 9.
After saving in IN/OUT register 9 is completed, "reG Full" appears on the LOCATE TIME display and no more punch-in/out points can be saved.

Notes

- If you specify any point that is included in a already registered block for the punch-in point in step **3**, "O.V.L. (overlap)" appears on the LOCATE TIME display and the point is not saved.
- If you specify any point that is included in an already registered block for the punch-out point in step **4**, "O.V.L." appears on the LOCATE TIME display, and the point is not saved. The punch-in point that was saved in step **3** is also cleared.
- When "O.V.L." is displayed, check the registered punch-in/punch-out points as necessary (see "checking the registered punch-in/out points" on the next page) and save new points.
  The "O.V.L." indication is cleared when a new point is saved or by your pressing the CLEAR button.

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Saving time values directly in the IN and OUT-point registers

In continuous auto punch mode, you can directly save punch-in and punch-out points in any desired register pair by specifying the number (1 through 9) of the registers.

1 Enter the time value for the punch-in point on the LOCATE TIME display using the numeric buttons.

2 Press and light the STORE button, then press the IN button.

The STORE button goes off and "In" is displayed on the lower CUE display.

3 Enter the time value for the punch-out point on the LOCATE TIME display using the numeric buttons.

4 Press and light the STORE button, then press the OUT button.

The STORE button goes off and "ou" is displayed on the lower CUE display.

5 Press and light the STORE button, then enter the number of the target registers on the upper CUE display.

The STORE button goes off, and the time values specified in steps **1** and **3** are saved in the IN/OUT-point registers of the numbers specified in step **5**.

Notes

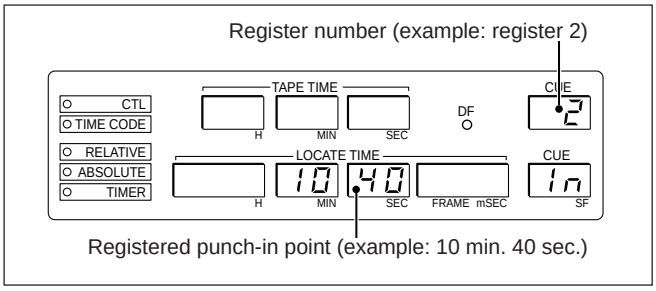
- If you specify a section that overlaps a section already saved in another register, "O.V.L. (overlap)" appears on the LOCATE TIME display and saving is not executed.
- When "O.V.L." is displayed, check the registered punch-in/out points as necessary (see "Checking the registered punch-in/out points" below) and save other points.
  The "O.V.L." indication is cleared when a new point is saved or by your pressing the CLEAR button.
- Even if punch-in and punch-out points have already been saved in the specified register, the newly specified points are saved when you execute step **5**.
- Continuous auto punch in/out is executed automatically in the order of the punch-in points. The order of the punch-in points need not correspond to the order of the registers.

Checking the registered punch-in/out points

To check the punch-in/out points that have been saved in each register pair, proceed as follows.

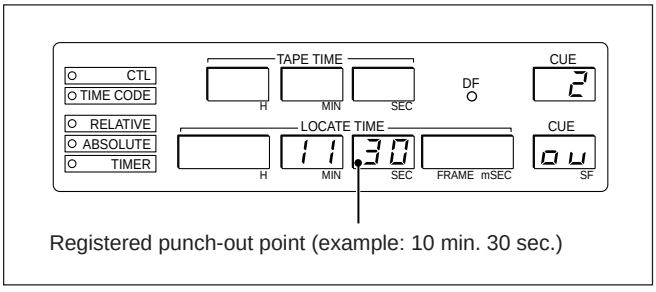
1 Press and light the RECALL button, then enter the desired register number using the numeric buttons.

The RECALL button goes off and the saved punch-in point is displayed on the time data display.



2 Press and light the RECALL button, then press the OUT button.

The RECALL button goes off and the corresponding punch-out point is displayed in place of the punch-in point.



Repeat steps **1** and **2** for all the registers to be checked. When checking is completed, press the CLEAR button.

Canceling the registered punch-in/out points

Specify 0 (zero) for all the digits of the punch-in and punch-out points in steps **1** and **3** of the procedure for "Saving time values directly in the IN and OUT-point registers" on the previous page, then specify the number of the register to be cleared.
You can also cancel the punch-in and punch-out points by pressing the CLEAR button after displaying the time value in steps **1** and **3**.

4-5-3 Executing Continuous Auto Punch In/Out

Auto punch in/out of all the registered blocks is executed from the earliest punch-in point in the time sequence.

Rehearsal using continuous auto punch in/out

Press the AUTO PUNCH button.
Playback begins from the preroll point for the first section (with the earliest punch-in point), and rehearsal is carried out between the punch-in point and punch-out point. When rehearsal of the first section is completed, the tape is played back up to the punch-in point of the next section. When rehearsal of the last section is completed, the tape stops at the postroll point for the last section.

Recording using continuous auto punch-in/out

Holding down the AUTO PUNCH button, press the REC button.
Playback begins from the preroll point for the first section (with the earliest punch-in point), and recording is carried out between the punch-in point and punch-out point. When recording of the first section is completed, the tape is played back up to the punch-in point of the next section. When recording of the last section is completed, the tape stops at the postroll point for the last section.

4-6 Registers and the LOCATE TIME Display

4-6-1 Registers

This unit has the following registers:
- Cue point registers (maximum 100)
- IN point register
- OUT point register
- Preroll time register
- Postroll time register
- Sync offset time register
- Sound memory playback start point register
- Sound memory write start point register
- Sound memory write end point register
- Memory editing start point register
- Memory editing end point register
- Memory playback time register

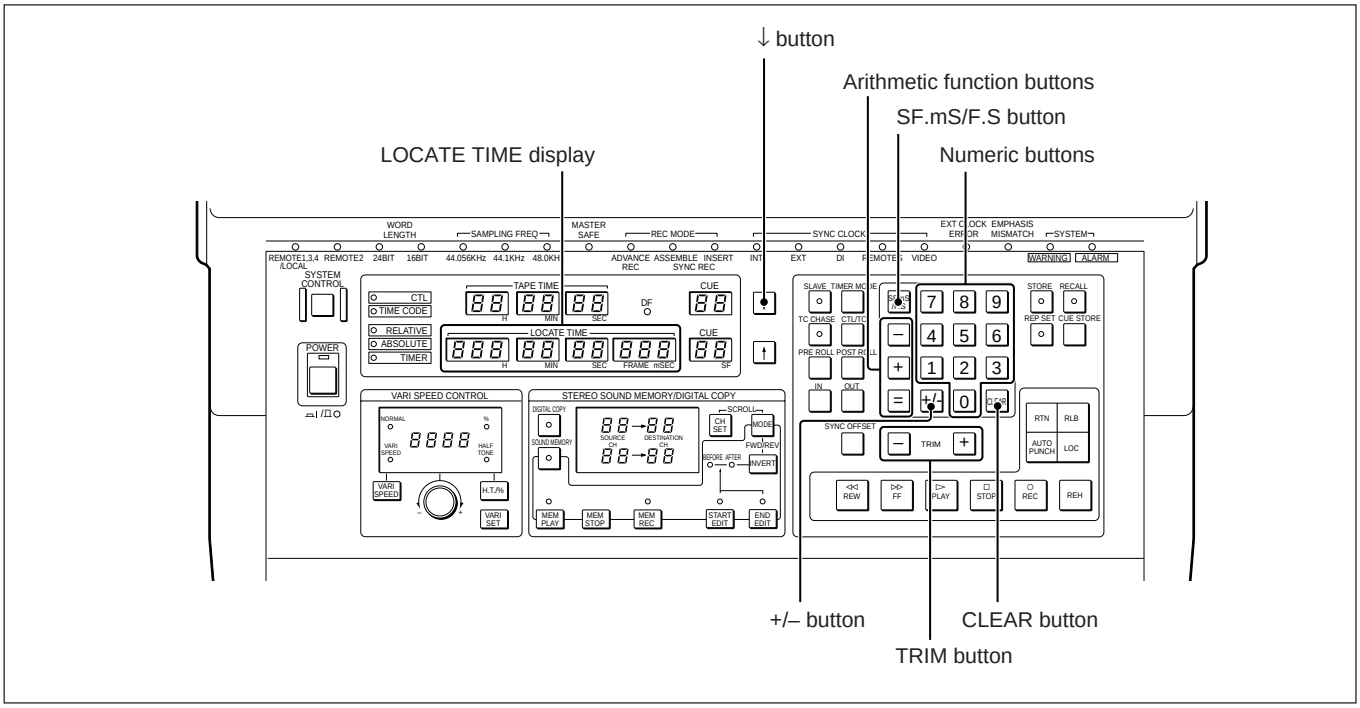
For the following registers, by pressing the TRIM +/– buttons and register specification buttons simultaneously you can adjust the register values (in millisecond units), automatically saving the new value.
- IN point register
- OUT point register
- Sound memory playback start point register
- Memory editing start point register
- Memory editing end point register

For the sync offset time register, by pressing the TRIM +/– buttons and register specification button simultaneously you can adjust the time value in subframe (1/100 frame) units, automatically saving the new value.

4-6-2 LOCATE TIME Display

Displaying a time value on the LOCATE TIME display

Use the following buttons to enter and correct time values.



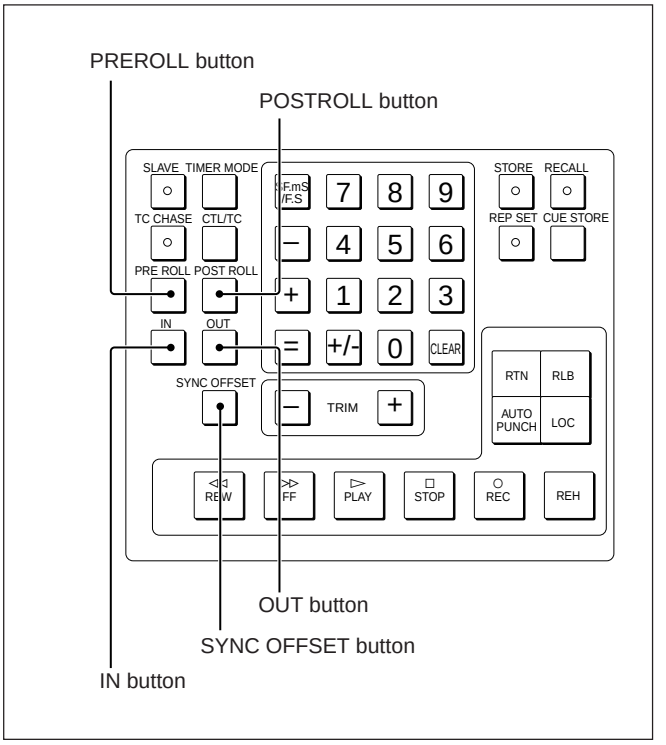
Time data operation buttons

Numeric buttons: Use these buttons to input a time. The value scrolls from the right as you input it.
CLEAR button: Clears the value to all zeros.
+/– button: Reverses the sign of the time value.
Arithmetic function buttons: These function as on a conventional calculator, except that they operate in base 60, to give the appropriate arithmetic for time values.
↓ button: This transfers the value on the TAPE TIME display to the LOCATE TIME display.
TRIM buttons: These adjust the value by plus or minus one. The correction unit is determined by the setting of the SF.mS/F.S button setting and the timer display mode as follows.

SF.mS/F.S button setting	Timer display mode	Correction unit
SF.mS	Time code chase or synchronized operation	Subframe (1/100 frame)
	CTL display mode	Seconds
F.S	Time code display mode	Frames
	CTL display mode	Seconds

4-6-3 Using Registers to Save and Retrieve Time Values

Saving



Using registers to save and retrieve time values

Use the following procedure to save a time value.

1 Use the numeric buttons to input the time value and show it on the LOCATE TIME display.

2 Press and light the STORE button, then enter the required cue point register number using the numeric buttons.

When up to 100 cue point registers can be used, enter a two-digit number.
To select a special-purpose register, in place of the numeric buttons, press one of the following buttons:
- IN point register: IN button
- OUT point register: OUT button
- Preroll-time register: PREROLL button
- Postroll-time register: POSTROLL button
- Sync offset time register: SYNC OFFSET button

Retrieving

To retrieve a stored time value, press and light the RECALL button, then enter the number of the corresponding cue point register using the numeric buttons.

To retrieve a value from one of the special-purpose registers, in place of the numeric buttons, press the corresponding button used in step **2** for saving the value in step **2**.

For details on saving and retrieving values from registers for the sound memory function, see Section 5-3, "Registers for the Sound Memory Function" (page 5-3).

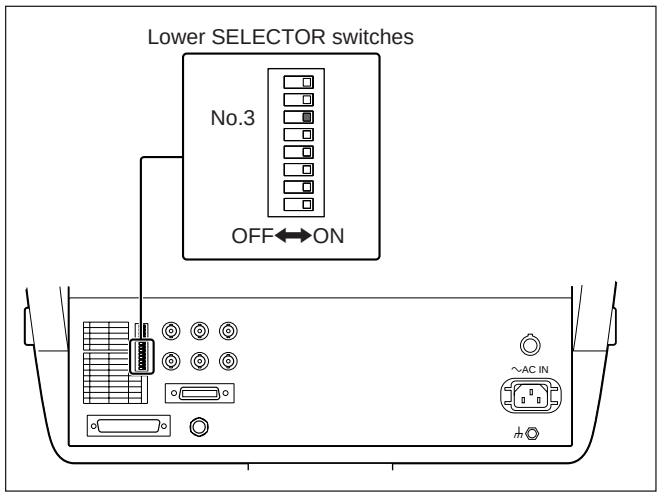
4-6-4 Selecting the Number of Cue Point Registers

Switch No.3 of the lower set of SELECTOR switches on the rear panel is used to select the maximum number of cue-point registers which can be used.

ON (10 CUE): Maximum 10 registers (0 to 9)
OFF (100 CUE): Maximum 100 registers (00 to 99)

Note

Make this selection before turning the power on. Changing the switch setting has no effect once the unit is powered up.

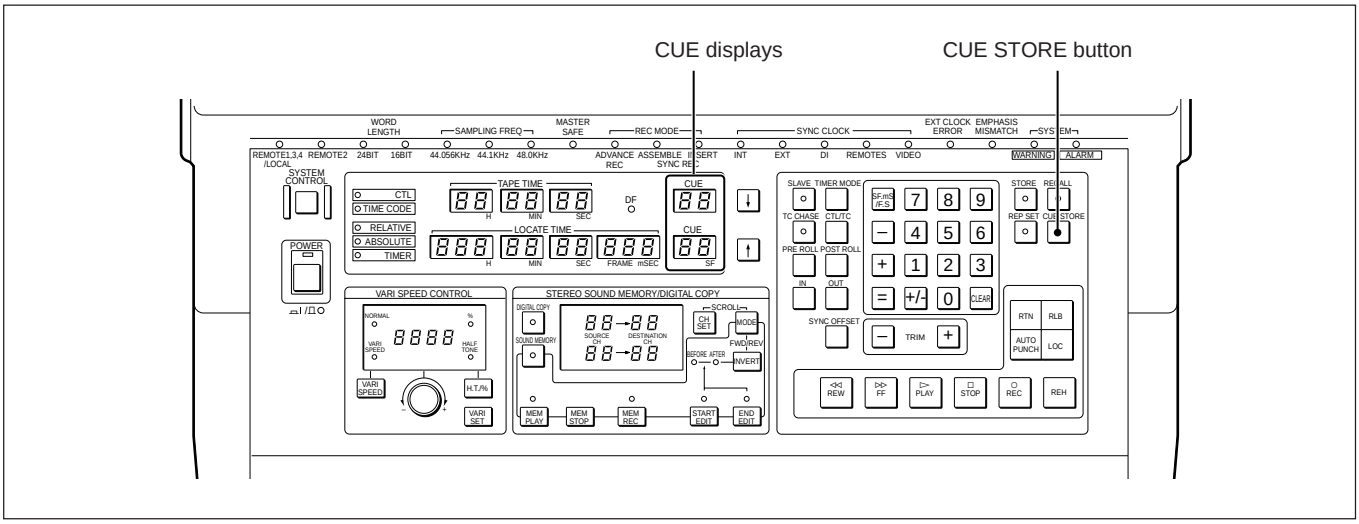


Selecting the number of cue point registers

4-6-5 Saving a Time Value Directly

You can also save a time value in a register without using the STORE button.

Saving directly in a cue point register



Saving directly in a cue point register

Listening to the playback signal, press the CUE STORE button at the required point.
The time value at the instant the button was pressed appears on the LOCATE TIME display and is saved in the cue point register.

The number of the cue point register used is the next number after the number displayed on the lower CUE display before pressing the CUE STORE button. Before pressing the CUE STORE button, be sure that the number displayed is one less than the number of the required cue point register.

Example:
When using up to 100 cue point registers, here we save a time value in cue point register 11.

1 Press the RECALL, 1, and 0 buttons in that order.

The time value held in cue point register 10 is recalled, and the lower CUE display indicates the cue number 10.

2 Listening to the playback signal, press the CUE STORE button at the required point.

The time value at the instant the button was pressed appears on the LOCATE TIME display, and is saved in cue point register 11. The lower CUE display indicates the cue number 11.

Saving directly in the IN point or OUT point register

Carrying out a rehearsal or recording saves the corresponding time values in the IN point register and OUT point register.

For details, see Section 4-4-1, "Saving Punch-In/Out Points During Rehearsal or Recording" (page 4-15).

Saving directly in other registers

For details on saving directly in registers for the sound memory function, see Section 5-3, "Registers for the Sound Memory Function" (page 5-3).

4-6-6 Direct Trim Adjustment

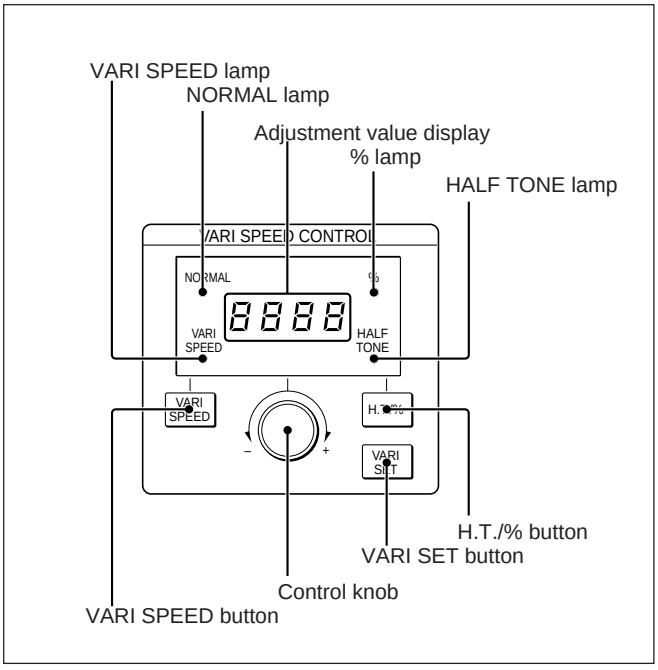
For each of the following registers, holding down the corresponding register button while pressing the TRIM +/– buttons adjusts the time value in the register, and saves the new value.

- **IN point register:** IN button
- **OUT point register:** OUT button
- **Preroll time register:** PREROLL button
- **Postroll time register:** POSTROLL button
- **Sync offset time register:** SYNC OFFSET button
- **Memory editing start point register:** START EDIT button
- **Memory editing end point register:** END EDIT button

4-7 Adjusting the Tape Speed

Adjustment range

The tape transport speed is adjustable in a range of ±12.5%. The adjustment steps are 0.1%.



Adjusting the tape speed

Adjustment indication

There are two ways of displaying the speed adjustment:

As a percentage: When the % lamp is lit, display the adjustment in 0.1% steps.

In semitones: When the HALF TONE lamp is lit, display the adjustment as a value between –2.31 and +2.04.

A value of +1.00 indicates a change such that the pitch will be a semitone higher, and –1.00 indicates a pitch one semitone lower.

The H.T./% button toggles between the two modes.

Adjustment procedure

Use the following procedure to adjust the tape speed. The adjustment is effective only when the SYNC CLOCK switch in the system control block of the PCM-3348HR is set to INT-NORM or VIDEO.

1 Press the VARI SET button.

The adjustment value display flashes.

2 Use the H.T./% button to select the display units.

Either the % lamp or the HALF TONE lamp lights to indicate the display mode.

3 Turn the control knob to show the required value on the display.

The displayed value flashes.

4 Press the VARI SET button.

The displayed value changes from flashing to constantly lit.

5 Press the VARI SPEED button.

The VARI SPEED lamp lights, and tape transport now operates at the adjusted speed.

Exiting the variable speed mode

Press the VARI SPEED button, lighting the NORMAL lamp.

To vary the speed while the tape transport is operating

Repeat steps **1** to **4** above.

Adjusting the tape speed using the numeric buttons

1 Use the H.T./% button to select the display units.

2 Enter the required adjustment in the selected units (maximum of three digits) using the numeric buttons. This value appears on the LOCATE TIME display.

Examples:
To input "0.01" press 0, 0 and 1 in turn.
To input "–0.01" first set the timer mode to RELATIVE using the TIMER MODE button, then press 0, 0, 1 and +/– in turn.

3 Press the STORE button.

4 Press the VARI SET button.

The value displayed on the LOCATE TIME display is transferred to the adjustment display, which then flashes.

5 Press the VARI SET button.

The displayed value changes from flashing to constantly lit.

Notes on tape speed adjustment

- Whether tape transport is operating at the normal speed or at an adjusted speed, you can use the numeric buttons to adjust the speed.
- If the numeric value on the LOCATE TIME display is outside the range of ±12.5%, when you make the adjustment it is restricted to +12.5% or –12.5%.

Notes on tape speed adjustment during a synchronized operation

- When using external synchronization with a word sync signal or AES/EBU format digital audio signal, it is not possible to vary the tape speed.
- When you change the tape speed, the internal clock changes in synchronization. Therefore the word sync and sector sync signals output by the PCM-3348HR and the sampling frequencies of the digital input and output data values also change.

Tape speed indication during a vari-sync operation

If using the vari-sync function for variable speed playback, the current tape speed adjustment value appears on the adjustment value display.

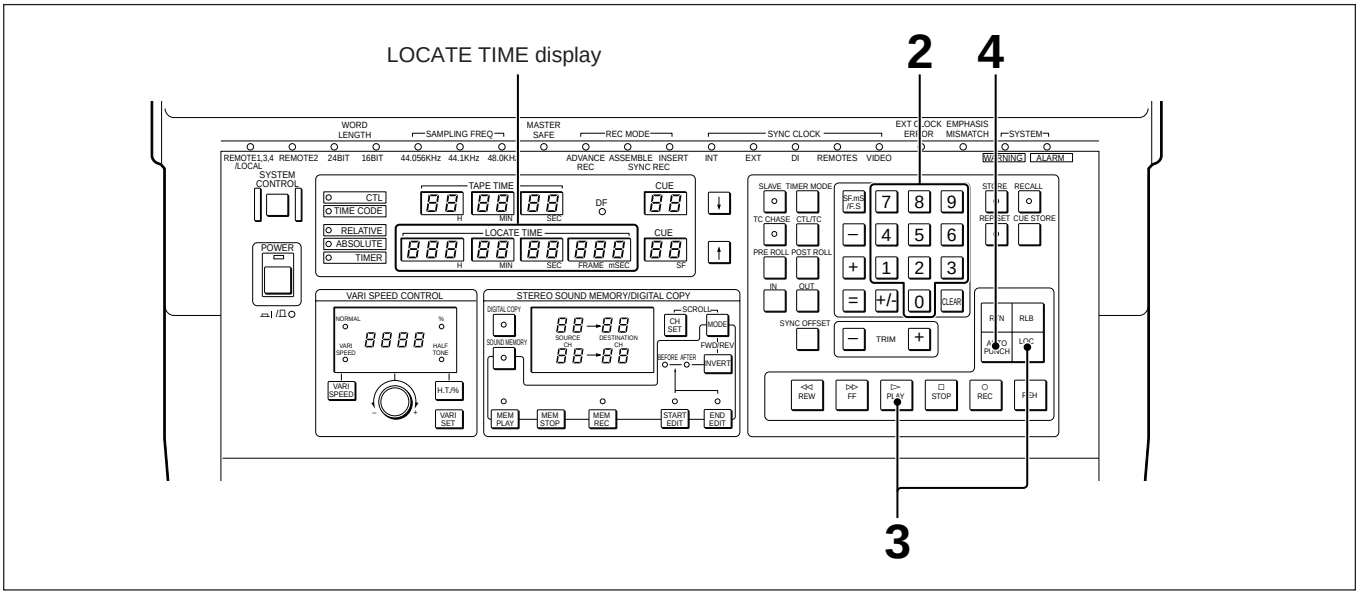
4-8 Setting the Preroll Time

The preroll time is initially set to 8 seconds.
There are two methods, as follows, for changing the preroll time.

- **Using direct auto punch-in/out mode**
  While listening to the playback sound, press the AUTO PUNCH button before the punch-in point; the point at which the button is pressed becomes the preroll point for the auto punch-in/out operation.
- **Using preroll auto punch-in/out mode**
  In this mode, after the time value for the preroll point is saved in the cue point register, it is subtracted from the punch-in point, and the preroll time thus obtained is saved.

4-8-1 Using Direct Auto Punch In/Out Mode

Use the following procedure to set the preroll time in direct auto punch-in/out mode.



Using direct auto punch-in/out mode to set the preroll time

1 Set switch No.2 of the upper set of the SELECTOR switches on the rear panel of the RM-3348HR to OFF (A.PUNCH).

This selects the direct auto punch-in/out mode.

For details on the direct auto punch-in/out mode and the position of the SELECTOR switches, see Section 4-4, "Auto Punch In/Out" (page 4-14).

2 Use the numeric buttons to display the time value for a point approximately 20 seconds before the punch-in point on the LOCATE TIME display.

3 Holding down the LOC button, press the PLAY button.

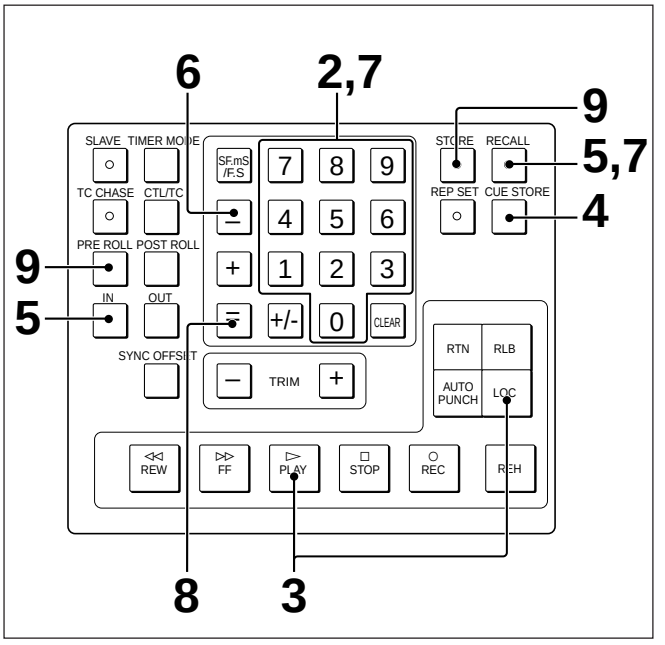
The tape automatically rewinds or fast-forwards to that point, then begins playback.

4 Listening to the playback sound, press the AUTO PUNCH button at the point you wish to make the preroll point.

This calculates and saves the preroll time on the basis of the selected preroll point.

4-8-2 Using Preroll Auto Punch In/Out Mode

Use the following procedure to set the preroll time in preroll auto punch-in/out mode.



Using preroll auto punch-in/out mode to set the preroll time

1 Set switch No. 2 of the upper set of the SELECTOR switches on the rear panel of the RM-3348HR to ON (NORM).

This selects the preroll auto punch-in/out mode. *For details on the preroll auto punch in/out mode and the position of the SELECTOR switches, see Section 4-4, "Auto Punch In/Out" (page 4-14).*

2 Use the numeric buttons to display the time value for a point approximately 20 seconds before the punch in point on the LOCATE TIME display.

3 Holding down the LOC button, press the PLAY button.

The tape automatically rewinds or fast-forwards to that point, then begins playback.

4 Listening to the playback sound, press the CUE STORE button at the point you wish to make the preroll point.

This saves the selected position in the cue point register.

5 Press the RECALL button, then the IN button, to display the time value for the punch-in point saved in the IN point register on the LOCATE TIME display.

6 Press the – (minus) button.

7 Press the RECALL button, then enter the number of the cue point register used in step **4** with the numeric buttons to display the time value for the preroll point on the LOCATE TIME display.

8 Press the = button.

This calculates the preroll time (punch-in point minus preroll point), and displays it on the LOCATE TIME display.

9 Press the STORE button, then the PREROLL button.

This saves the preroll time.

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4-9 Spot Erase Function

Use the following procedure to record a muting signal over a specific interval on the tape.

1 Press and light the REC READY button for the digital audio channel you wish to spot erase.

2 Enter the start point and end point for the spot erase as the punch-in/out points.

For details on setting the punch-in/out points, see Section 4-4-1, "Saving Punch-In/Out Points During Rehearsal or Recording" (page 4-15) and Section 4-4-2, "Saving Time Values Directly in the IN and OUT Point Registers" (page 4-16).

3 Press the REC MUTE button so that it flashes.

4 Holding down the AUTO PUNCH button, press the REC button.

A muting signal will be recorded between the punch-in point and punch-out point.

5-1 What Is Time Shift Editing?

The term "time shift editing" refers to copying an audio signal recorded on one channel on the tape to a different position either on the same channel or on another channel.
Time shift editing uses the sound memory function, which writes the audio signal into a special-purpose sound memory. The terms "source channel" and "destination channel" are used to refer to the channels from and to which the copy is made, respectively.

The sound memory function in this unit provides the following features.

- **Writing stereo or mono sound**
  The memory can hold 80 seconds of stereo sound or 160 seconds of mono sound.

- **Auto start function for writing to or reading from the sound memory based on the CTL addresses**
  In auto start mode, you can specify the start point for writing to or reading from the sound memory in terms of CTL addresses, to sector units.

- **External trigger mode**
  The external trigger mode allows an external analog signal to act as a trigger to begin writing to or reading from the sound memory.
  The delay from the start of signal input to the beginning of memory operation is no more than one sector.

- **Reverse playback**
  It is possible to play back sound from the sound memory in the reverse direction.
  This is useful for effects and similar operations.

5-2 Overview of Time Shift Editing Using the Sound Memory Function

The procedure of operations is as follows.

1 Write the required audio signal to the sound memory.

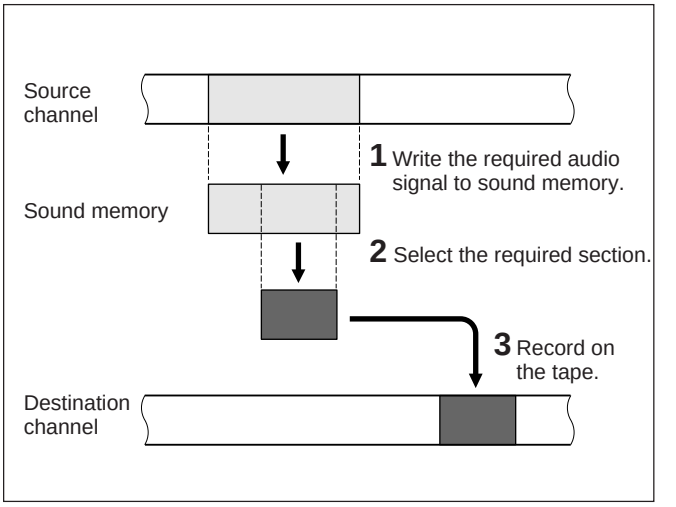
- Select the operation mode from among manual, auto start, and external trigger.
- Select the source and destination channels.
- Write the audio signal from the source channel(s) to the memory (maximum 80 seconds stereo or 160 seconds mono).

2 Select the required section of the sound in memory (sound memory editing).

- Select the playback direction.
- Adjust the memory playback start point and end point.
- After adjustment, play back from the sound memory for confirmation.

3 Record the selected section of sound on the tape.

- Select the operation mode from among manual, auto start, and external trigger.
- Select the playback direction.
- Using the sound memory function and auto punch in/out functions, carry out time shift editing.


Source channel
1 Write the required audio signal to sound memory.
Sound memory
2 Select the required section.
3 Record on the tape.
Destination channel

Time shift editing using the sound memory function

Sound memory capacity

The limit to the amount of audio signal which can be written to the sound memory depends on the sampling frequency and whether the sound is stereo or mono, as shown in the following table.

Sound memory capacity

Sampling frequency	Stereo	Mono
48.0 kHz	87.3 seconds	174.6 seconds
44.1 kHz	95.1 seconds	190.2 seconds
44.056 kHz	95.2 seconds	190.4 seconds

5-3 Registers for the Sound Memory Function

The sound memory function uses special-purpose registers to hold the following six data items. The indications in parentheses, which also appear on the lower CUE display, identify the registers being recalled.

- Sound memory playback start point (PS)
- Sound memory write start point (rS)
- Sound memory write end point (rE)
- Memory editing start point (SA)
- Memory editing end point (EA)
- Memory playback time (Pt)

5-3-1 Sound Memory Playback Start Point (PS)

The PS register holds the tape address at which the sound memory playback is to begin. During playback using the auto start mode, when the tape address is the same as the contents of the PS register, sound memory playback begins automatically.

Saving and adjusting values in the PS register

Automatic saving in the PS register

If during rehearsal, playback or recording you press the MEM PLAY button, the current tape address is automatically stored in the PS register.

Saving a specific tape address in the PS register

Use the following procedure.

1. Enter the required tape address on the LOCATE TIME display using the numeric buttons.
2. Press the STORE button.
3. Press the MEM PLAY button.

Adjusting the value in the PS register

Press the MEM PLAY button and TRIM +/– buttons simultaneously.
When using manual mode or external trigger mode for sound memory playback, it is not possible to change the contents of the PS register.

Recalling the PS register value

Press and light the RECALL button, then press the MEM PLAY button.
The time value in the PS register appears on the LOCATE TIME display.

5-3-2 Sound Memory Editing Start Point (SA) and End Point (EA)

The SA and EA registers hold the relative addresses within the sound memory of the start and end points respectively of the section of the sound memory which is to be used for playback. The relative addresses are based on the beginning of the sound memory counted as zero.

Saving and adjusting values in the SA and EA registers

Automatic saving in the SA and EA registers

If during playback from the sound memory you press the START EDIT or END EDIT button, the relative address of the current point in the sound memory is automatically saved in the SA or EA register, respectively.

Saving a specific address in the SA or EA register

Use the following procedure.

1. Enter the required relative address on the LOCATE TIME display using the numeric buttons.
2. Press the STORE button.
3. Press the START EDIT or END EDIT button.

Adjusting the value in the SA or EA register

Press the START EDIT or END EDIT button and TRIM + or – button simultaneously.

Recalling the SA or EA register value

Press and light the RECALL button, then press the START EDIT or END EDIT button.
The time value in the SA or EA register appears on the LOCATE TIME display.

5-3-3 Sound Memory Write Start Point (rS) and End Point (rE)

When using the auto start mode to write to the sound memory, the rS register holds the source channel tape address of the point where writing is to begin. In the auto start mode, the unit starts writing signal to the sound memory automatically when this point is reached.
The rE register holds the source channel tape address of the end of writing. This value is used as the tape address to end copying when copying an audio signal from source to destination channels with the same addresses.

Saving values in the rS and rE registers

Automatic saving in the rS register

During tape playback, rehearsal or recording, pressing the MEM REC button to write from the source channel to the sound memory automatically saves the tape address at which the writing began in the rS register.

Automatic saving in the rE register

While copying from the source channel to the sound memory, pressing the MEM STOP button to stop writing to the sound memory automatically saves the tape address at which the writing ends in the rE register. If writing to sound memory ends because the memory is full, the end tape address is similarly saved in the rE register.

Saving a specific tape address in the rS register

Enter the required address on the LOCATE TIME display with the numeric buttons, then press the STORE and MEM REC buttons in that order.

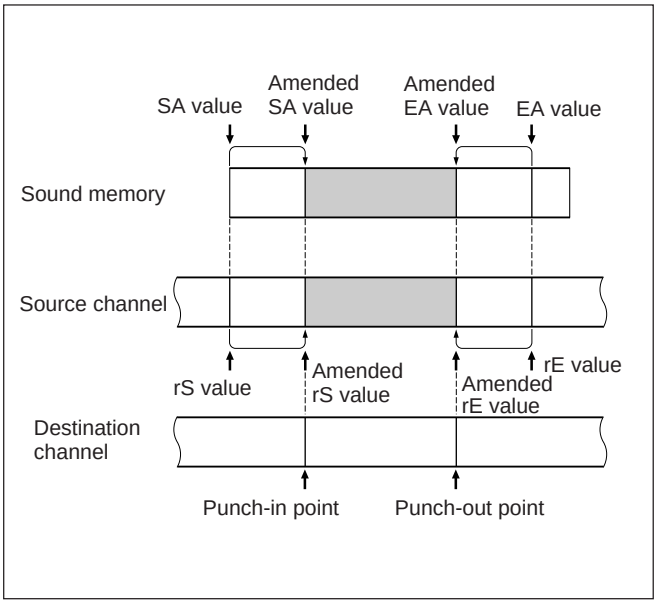
Adjusting the value in the rS register

While in auto start mode to write to sound memory, press the MEM REC and TRIM + or – button simultaneously. It is not possible to adjust the value in the rS register in this way while in manual mode or external trigger mode.

Indirectly adjusting values in the rS and rE registers

If you change the relative addresses within the sound memory for the memory editing start point (SA register) and memory editing end point (EA register), the values in the rS and rE registers also automatically change accordingly. Therefore, when copying from one channel on the tape to another channel using the same addresses, the values in the rS and rE registers can be used unchanged for the punch-in point and punch-out point on the destination channel.

For details on the procedure for copying with the same addresses, see Section 5-10-6, "Copying an Audio Signal to the Same Address on Another Channel" (page 5-26).



Automatic adjustment of rS and rE values and copying to another channel with the same address

Recalling the rS or rE register value

Press and light the RECALL button, then press the MEM REC or MEM STOP button, to show the value of the rS or rE register, respectively, on the LOCATE TIME display.
It is possible to recall the value in the rS or rE register even when the RM-3348HR unit is in the sound memory writing mode.

5-3-4 Sound Memory Playback Time (Pt Register)

The Pt register holds a value representing the length of the selected portion of the sound memory signal. When the values for the memory editing start point (SA register) and memory editing end point (EA register) are determined, this register is automatically Set to the difference (Pt=EA–SA). This is used to determine the punch-out point during time shift editing.
It is neither possible to use the numeric buttons to set the Pt register to a specific value nor to adjust its value with the TRIM +/– buttons.

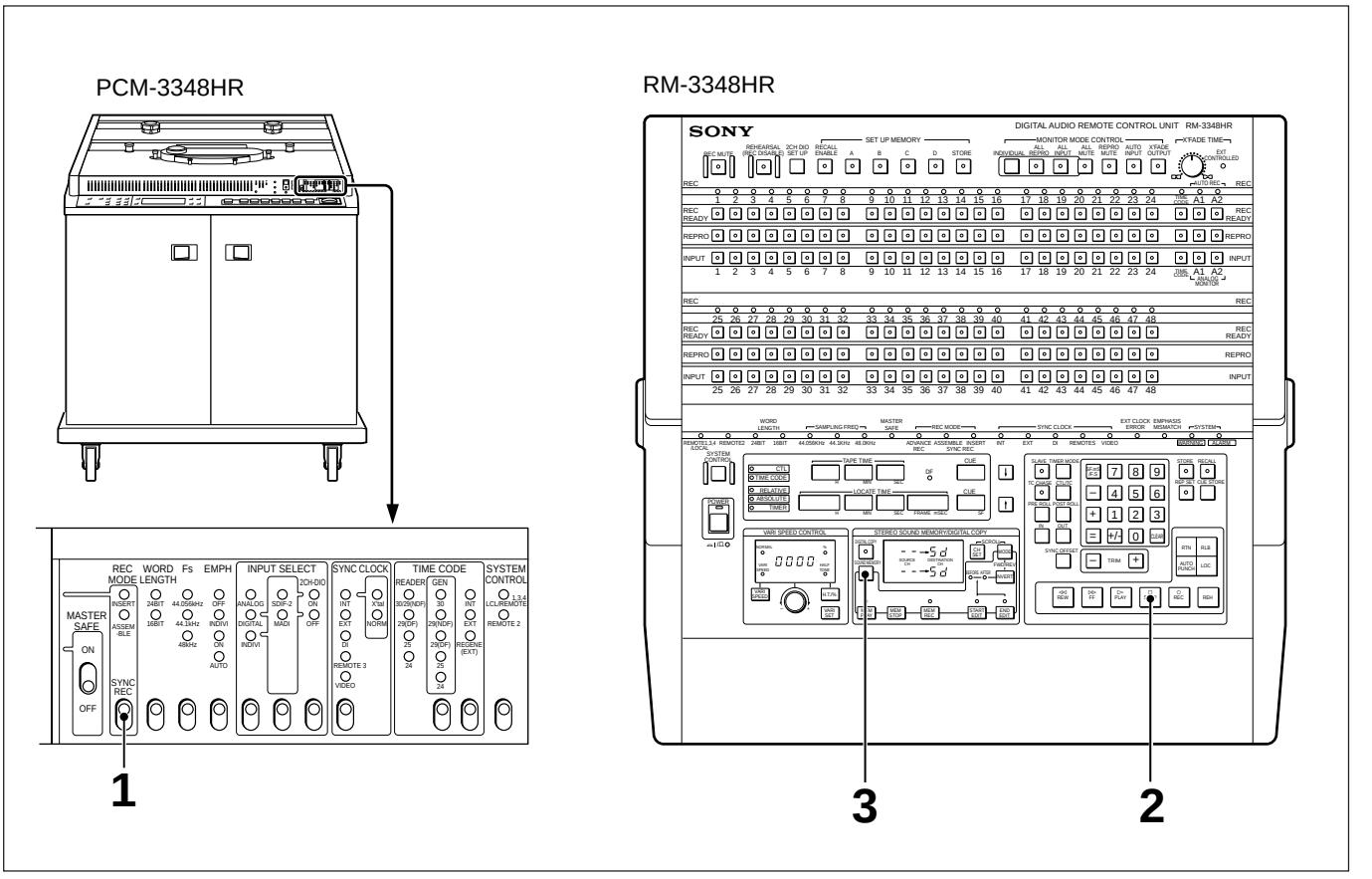
Recalling the Pt register value

Press and light the RECALL button, then press the SOUND MEMORY button.

5-4 Preparations for Time Shift Editing

5-4-1 Selecting the Sound Memory Mode

Use the following procedure to select the sound memory mode.



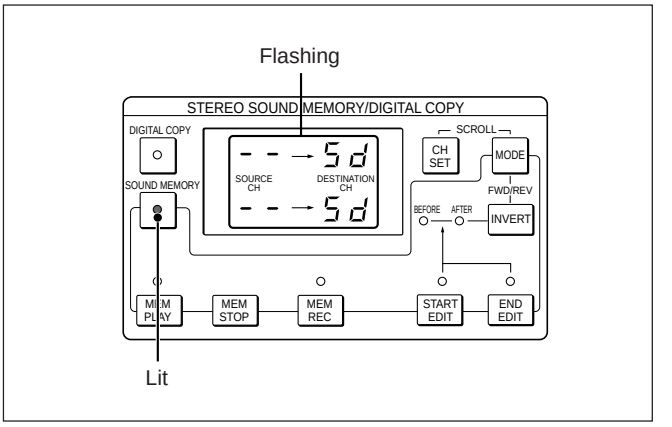
Selecting the sound memory mode

1 Set the REC MODE switch of the PCM-3348HR to INSERT.

2 Press the STOP button to stop tape transport.

3 Press and light the SOUND MEMORY button.

The REC READY, REPRO and INPUT buttons go off, and the RM-3348HR unit is now in the sound memory mode.
The channel display appears as shown in the figure to the right.



Channel display of the RM-3348HR

5-4-2 Selecting the Source and Destination Channels

This section describes the procedure by way of an example, for copying a stereo signal, with the following source channel and destination channel settings.

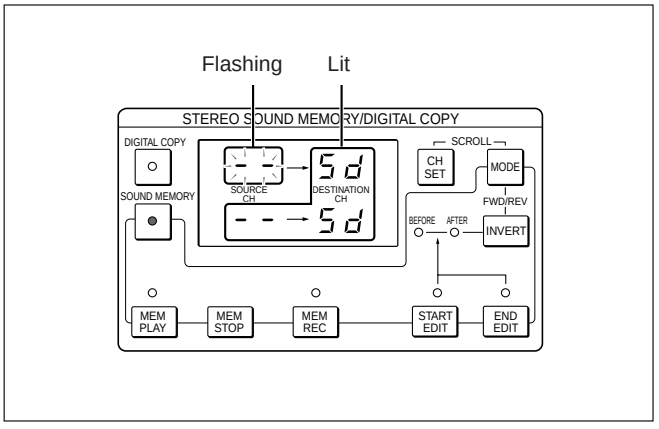
- First source channel: Channel 1
- Second source channel: Channel 2
- First destination channel: Channel 3
- Second destination channel: Channel 4

Procedure

Use the following procedure to make the channel settings as described above.

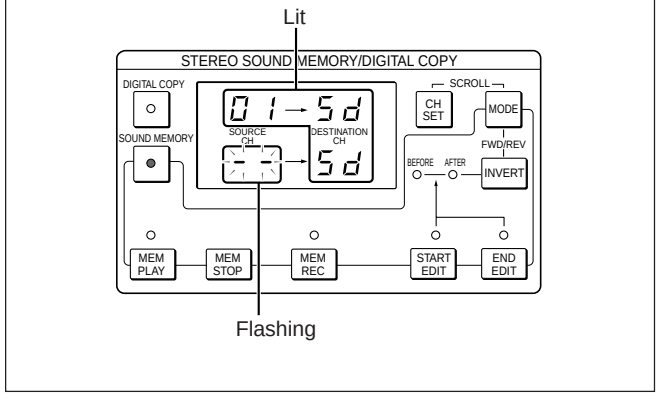
1 Press and light the SOUND MEMORY button.

The channel display appears as shown below.



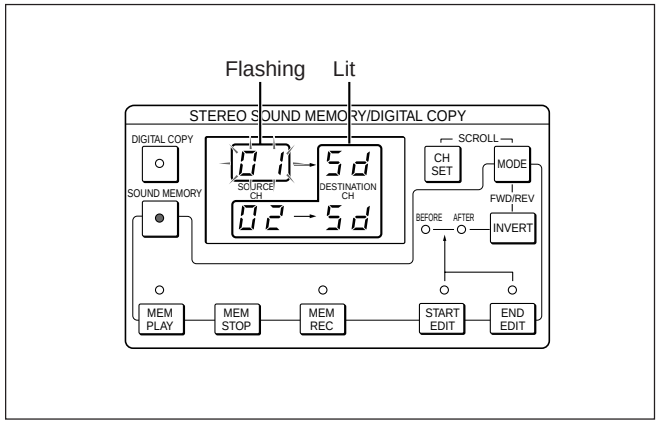
2 Press the INPUT button or REPRO button for the first source channel (channel 1 in this example), so that it starts flashing.
Press the INPUT button to copy the input signal, and the REPRO button to copy the playback signal.

The channel number input appears on the upper source channel display.



3 Press the INPUT button or REPRO button for the second source channel (channel 2 in this example), so that it starts flashing.
Press the INPUT button to copy the input signal, and the REPRO button to copy the playback signal.

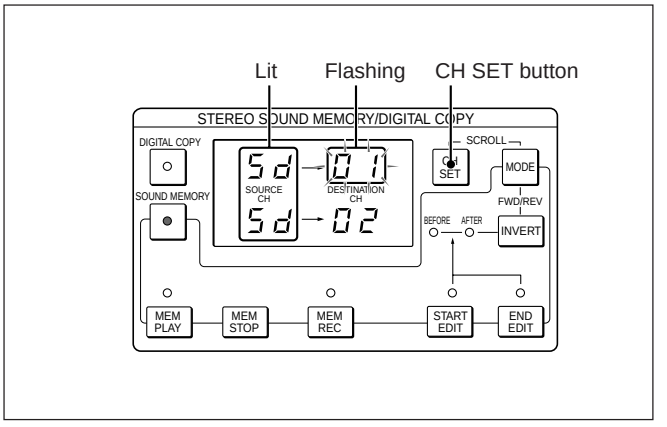
The channel number input appears on the lower source channel display.



(Continued)

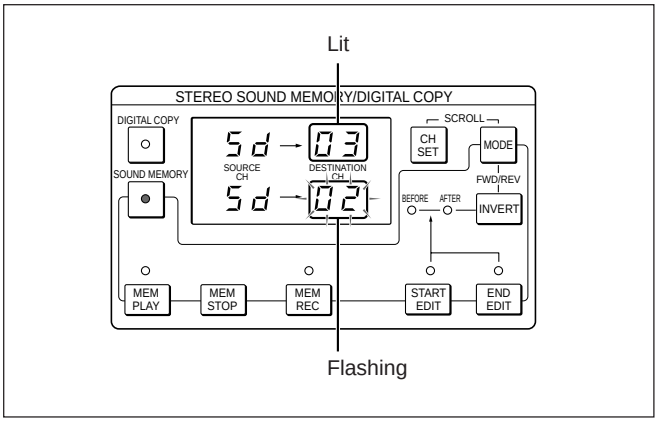
4 Press the CH SET button.

This sets the channels input in steps **2** and **3** as the source channels, and the indication "Sd" appears on the source channel display.
At the same time, the channel numbers set for the source channels appear on the destination channel display.



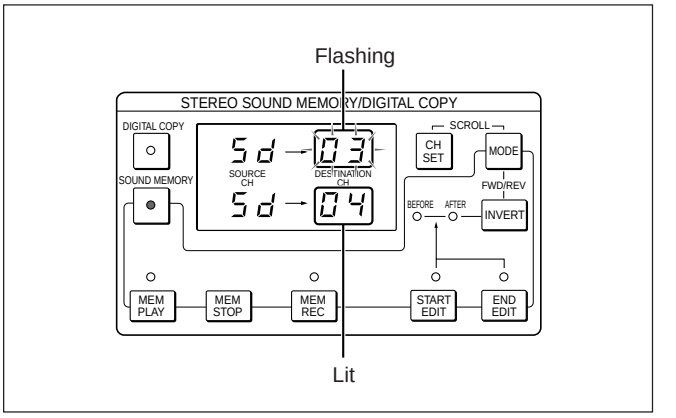
5 Press the REC READY button for the first destination channel (channel 3 in this example), so that it starts flashing.

The channel number input appears on the upper destination channel display.



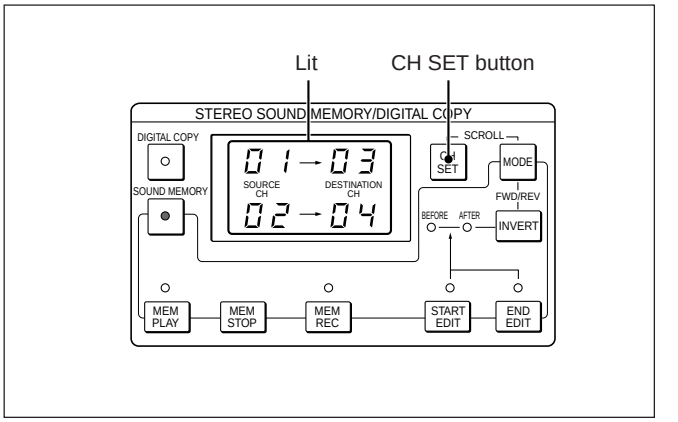
6 Press the REC READY button for the second destination channel (channel 4 in this example), so that it starts flashing.

The channel number input appears on the lower destination channel display.



7 Press the CH SET button.

This sets the channels input in steps **5** and **6** as the destination channels. The source channel and destination channel numbers are displayed.



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Copying a monaural signal

Skip steps **3** and **6** above.

Changing the channel numbers during the input operation

While a channel number displayed is flashing, you can input a different channel number simply by pressing the INPUT button, REPRO button or REC READY button for another channel.

Changing the signal source after setting the source channels

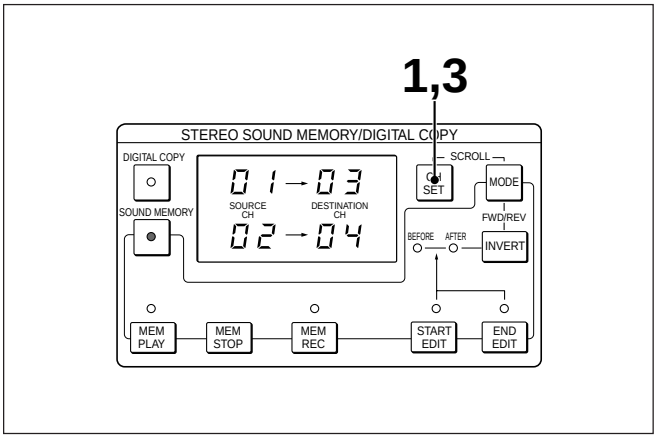
Pressing the INPUT button or REPRO button switches the signal source to the input or playback signal. You can change the signal source even when the source channel and destination channel are the same.

Setting a channel other than the destination channel(s) to the recording ready state

Even after setting the source channels and destination channels, you can press the REC READY button for a channel other than the destination channel, setting it to the recording ready state. Once the source channel and destination channel settings for the sound memory function have been made, channels not being used for the sound memory function return to their original states.

5-4-3 Changing the Channel Settings

Use the following procedure to change the source or destination channels after setting them.



Changing the channel setting

1 Press the CH SET button.

For each channel, the indication for the current setting flashes.

2 **To change the source channels**
Press the INPUT button or REPRO button of the new channel while the channel indication for the current setting is flashing.

To change the destination channels
Press the REC READY button of the new channel while the channel indication for the current setting is flashing.

To leave a setting unchanged
Press the button corresponding to the channel whose indication is flashing.

Each time you press an INPUT, REPRO or REC READY button, the channel whose indication is flashing changes to the next channel to be set.

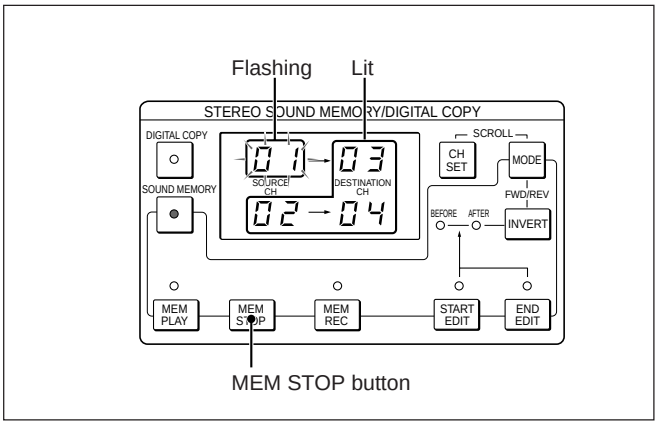
3 After changing the settings, check that the displayed settings are correct, then press the CH SET button.

5-4-4 Selecting the Sound Memory Playback Direction

Use the following procedure to select whether to use the forward direction or reverse direction for sound memory playback.

1 Check that the SOUND MEMORY button is lit, then press the MEM STOP button to select the memory stop mode.

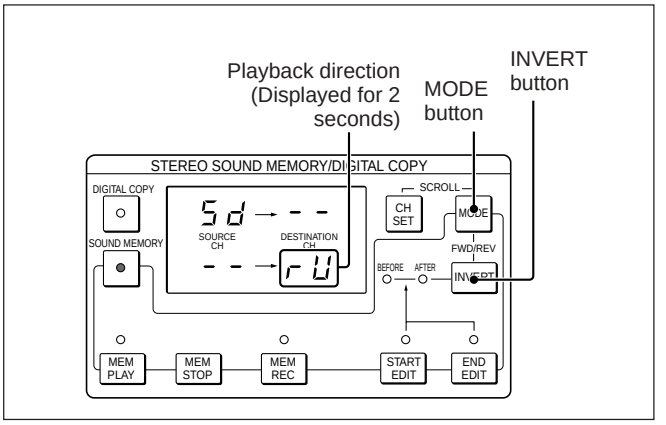
The MEM PLAY, MEM REC, START EDIT and END EDIT lamps all go off, and the channel display appears as shown below.



2 Press the MODE button and INVERT button simultaneously to toggle the playback direction.

The lower destination channel display shows the mode selected, using the following codes.

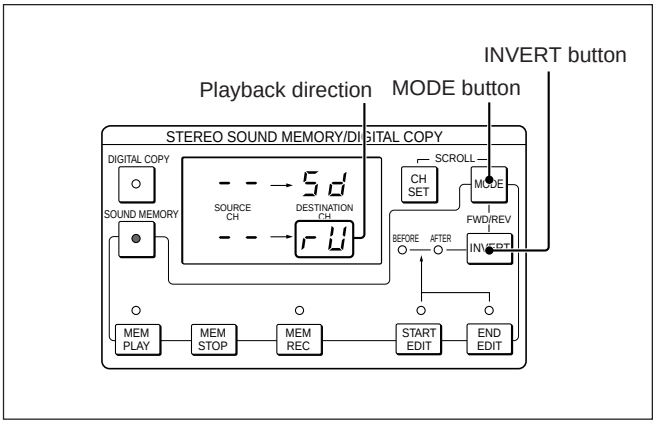
- rU: reverse
- Sd: forward



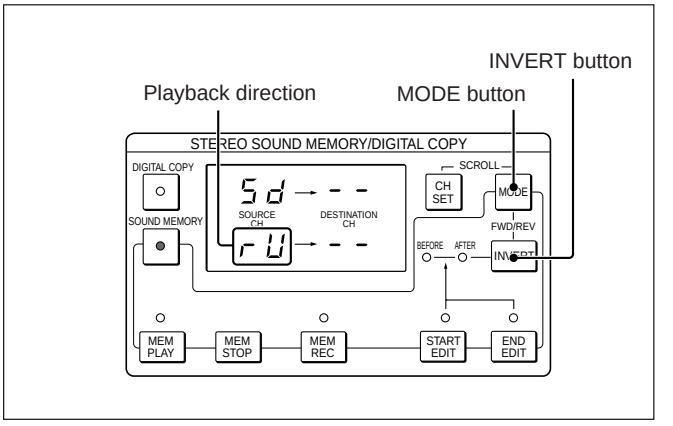
To change the playback direction while setting the channels

Press the MODE button and INVERT button simultaneously.
The playback direction is then displayed as shown below.

- While setting the source channel



- While setting the destination channel



5-5 Setting the Sound Memory Operation Mode

5-5-1 Sound Memory Operation Modes

There are three operation modes.

- **Manual mode**
  In this mode, you press a button to begin writing to or playback from the sound memory.

- **Auto start mode**
  In this mode, writing to or playback from the sound memory begins automatically when the tape reaches a previously entered tape address.

- **External trigger mode**
  In this mode, an external trigger signal automatically activates the writing to or playback from the sound memory.

5-5-2 Setting Procedure

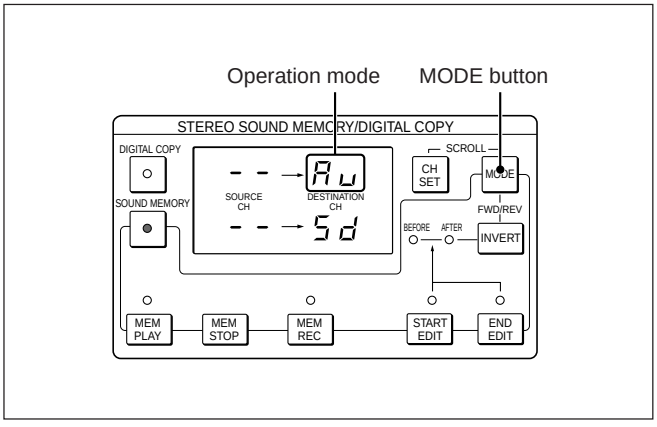
Use the following procedure to set the sound memory operation mode.

1 Check that the SOUND MEMORY lamp is lit and the unit is in the memory stop mode.

If the unit is not in the memory stop mode (the MEM PLAY, MEM REC, START EDIT or END EDIT lamps is lit), press the MEM STOP button.

2 Press the MODE button to cycle through the modes.

The upper destination channel display shows the mode selected, using the following codes.
- Au: Auto start mode
- Et: External trigger mode
- Sd: Manual mode



5-6 External Trigger Mode

Function

In the external trigger mode, an external trigger signal activates the writing to or playback from the sound memory.

5-6-1 Trigger Modes

There are two trigger modes.

- **Retriggerable mode**
  If the trigger signal is applied during sound memory playback, playback restarts from the beginning of the sound memory.
  During writing to sound memory, applying the trigger signal has no effect.

- **Non-retriggerable mode**
  During sound memory playback, even if the trigger signal is applied again, playback continues until the end of the sound memory.
  During writing to sound memory, applying the trigger signal has no effect.

External trigger signal input connector

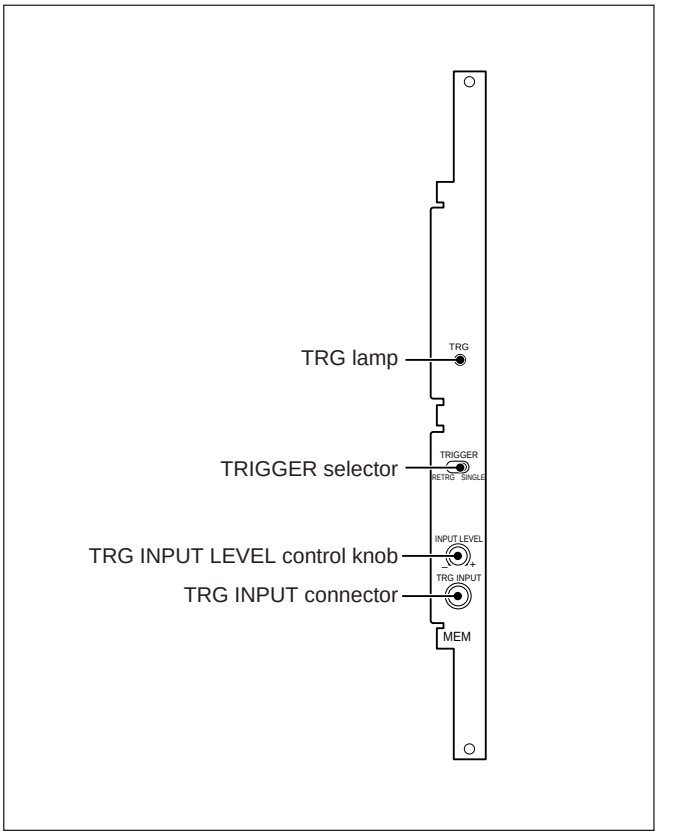
The trigger signal can be connected either to the PCM-3348HR or to the RM-3348HR. For triggering writing to the sound memory, an input signal to either connector has the same effect. For triggering playback from the sound memory, however, the functions are different, as follows.

- **SOUND MEMORY EXT TRIGGER IN connector on the RM-3348HR rear panel**
  This always operates in retriggerable mode.

- **TRG INPUT connector on the MEM board in the PCM-3348HR or SOUND MEMORY TRIGGER INPUT connector on the rear panel of the PCM-3348HR**
  A switch setting on the MEM board determines whether the unit operates in retriggerable or non-retriggerable mode.

5-6-2 Inputting a Trigger Signal to the PCM-3348HR

Use the following procedure to input a trigger signal to the PCM-3348HR.



MEM board

1 Select the trigger mode using the TRIGGER selector switch on the MEM board.
RETRG: Retriggerable mode
SINGLE: Non-retriggerable mode

2 Connect the analog signal to be used as the trigger signal via the TRG INPUT connector on the MEM board or the SOUND MEMORY TRIGGER INPUT connector on the rear panel of the PCM-3348HR.

To use the analog signal recorded on track A1 or A2 as the trigger signal, set the OUTPUT ADV/NORM switch on the ARP board to ADV.

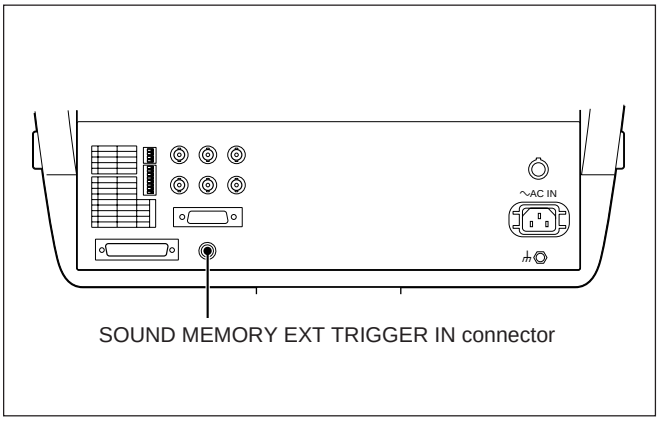
For details on the OUTPUT ADV/NORM switch, see "ARP board" (page A-23) in Appendixes "Location and Function of Parts."

3 Turn the TRG INPUT LEVEL control knob on the MEM board fully clockwise, and apply the trigger signal to the TRG INPUT connector or SOUND MEMORY TRIGGER INPUT connector, then turn the TRG INPUT LEVEL control knob counterclockwise until just before the TRG lamp goes off.

Check that the TRG lamp lights when the trigger signal is applied.

When the trigger signal goes active, the TRG lamp lights, and the trigger is applied, to start the writing to or playback from the sound memory, after a maximum delay of one sector.

5-6-3 Inputting a Trigger Signal to the RM-3348HR



Inputting a trigger signal

Connect the trigger signal via the SOUND MEMORY EXT TRIGGER IN connector on the rear panel of the RM-3348HR. This is a switch contact type signal; that is, it should normally be connected to a relay contact, for example. A trigger signal connected via this connector always operates in retriggerable mode.

When a trigger signal is connected both to the PCM-3348HR and to the RM-3348HR

The trigger signal input to the RM-3348HR takes precedence, as follows.

- If the signal input to the PCM-3348HR has triggered sound memory playback, then if during sound memory playback the signal input to the RM-3348HR goes active even if the PCM-3348HR is in the non-retriggerable mode, the signal retriggers.
- If the signal input to the RM-3348HR has triggered sound memory playback, then if during sound memory playback the signal input to the PCM-3348HR goes active, regardless of whether the PCM-3348HR is in the retriggerable mode or non-retriggerable mode, no retriggering occurs.

5-7 Writing to the Sound Memory

Use the following procedure to write the source channel signal to the sound memory.

5-7-1 Preparations

1 If the SOUND MEMORY button is off, press it to turn it on.

2 If the RM-3348HR is not in the memory stop mode (the MEM PLAY, MEM REC, START EDIT or END EDIT lamp is lit), press the MEM STOP button.

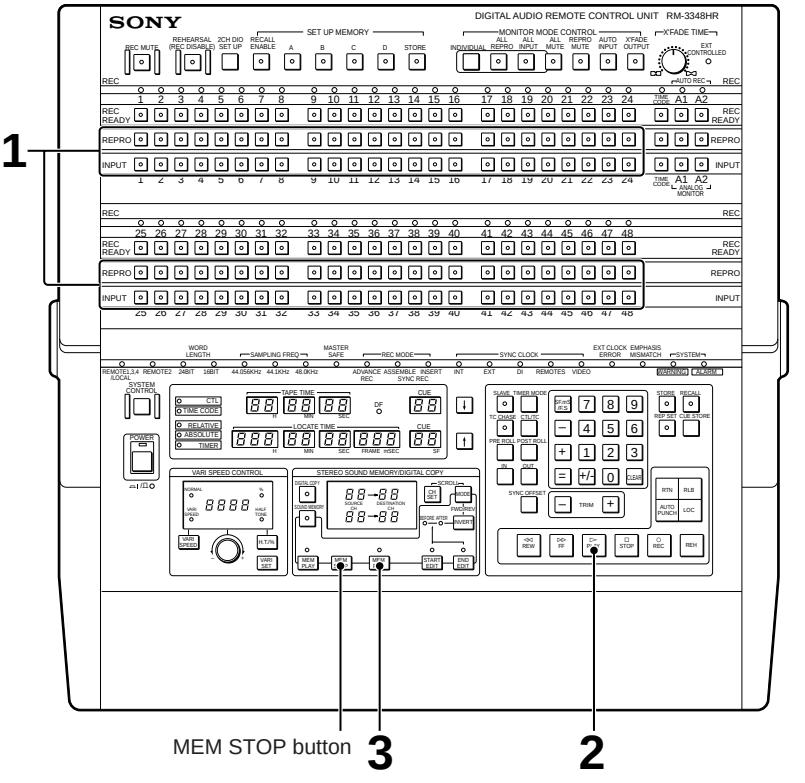
3 Check the source channel and destination channel selection.
For details on how to make the channel selections, see Section 5-4-2, "Selecting the Source and Destination Channels" (page 5-7).

4 Press the MODE button to confirm the sound memory operation mode.
For details on the sound memory operation mode settings, see Section 5-5-2, "Setting Procedure" (page 5-11).

5-7-2 Using Manual Mode for Writing to Sound Memory

Before carrying out writing to the sound memory, be sure to check that you have carried out the preparations described in Section 5-7-1, "Preparations" above.

Use the following procedure to write the source channel signal to the sound memory using manual mode.



Using manual mode for writing to sound memory

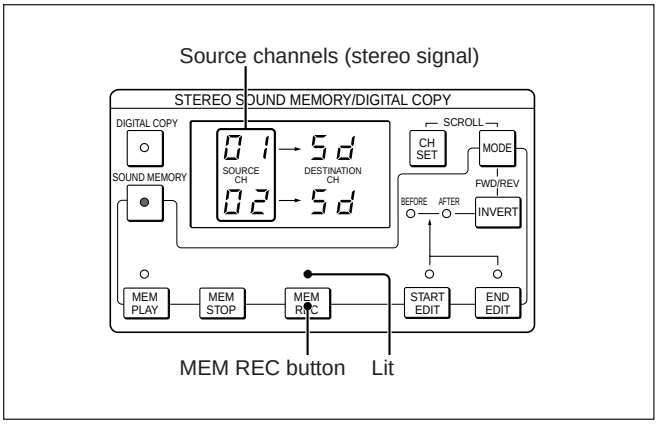
1 To copy the playback signal to the sound memory, press the REPRO button for the source channel, and to copy the input signal, press the INPUT button for the source channel.

2 **When you pressed the REPRO button in step 1**
Press the PLAY button slightly before the required section, and begin playback.

When you pressed the INPUT button in step 1
Input the signal from the external equipment.

3 Immediately before the required section, press the MEM REC button.

The MEM REC lamp lights, and writing to the sound memory begins. During writing, the source channel numbers are displayed.



Ending the writing to sound memory before the sound memory is full

Press the MEM STOP button.
The MEM REC lamp goes off, and writing to the sound memory stops.

If you do not press the MEM STOP button during writing

When the sound memory is full (after about 160 seconds for a mono signal, and 80 seconds for a stereo signal) writing automatically stops.

Restarting writing while still in progress

Press the MEM REC button.
This restarts the writing from the beginning of the sound memory.

Monitor output during writing

Pressing the REPRO, INPUT, ALL INPUT, ALL REPRO or AUTO INPUT buttons to switch the monitor signal during writing has no effect on writing of the audio signal.

Saving in the rS register and rE register

The tape address at which the MEM REC button was pressed (the start point for writing to sound memory) is automatically saved in the rS register, and the tape address at which the MEM STOP button was pressed or at which the sound memory became full (the end point for writing to sound memory) is automatically saved in the rE register.
If the input signal was written to sound memory while the tape was stopped, no tape address is saved in the rS register or rE register.

5-7-3 Using Auto Start Mode for Writing to Sound Memory

Before carrying out writing to the sound memory, be sure to check that you have carried out the preparations described in Section 5-7-1, "Preparations" (page 5-14).

Use the following procedure to write the source channel signal to sound memory using auto start mode.

1 Use either of the following methods to save a tape address in the rS register.

1) Write to sound memory using manual mode.

For details, see Section 5-7-2, "Using Manual Mode for Writing to Sound Memory" (page 5-14).

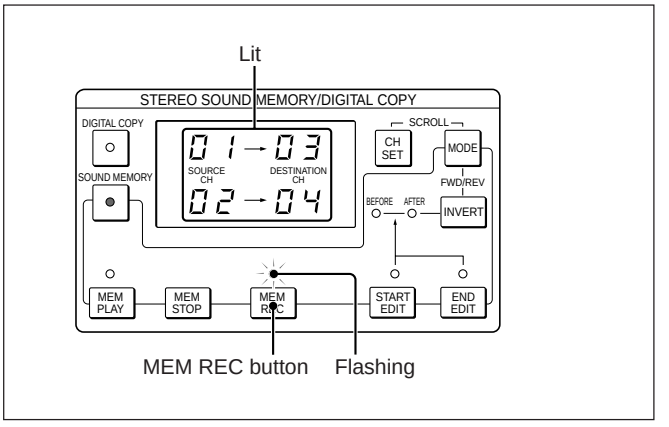
The tape address at which you pressed the MEM REC button is saved in the rS register.

2) Enter the required tape address on the LOCATE TIME display with the numeric buttons and press the STORE and MEM REC buttons in that order.

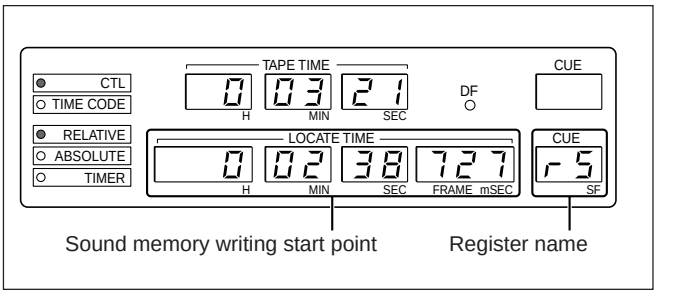
You cannot carry out writing to sound memory in the auto start mode unless there is a tape address in the rS register.

2 Press the MEM REC button.

The MEM REC lamp starts flashing, and the RM-3348HR enters the writing standby state.

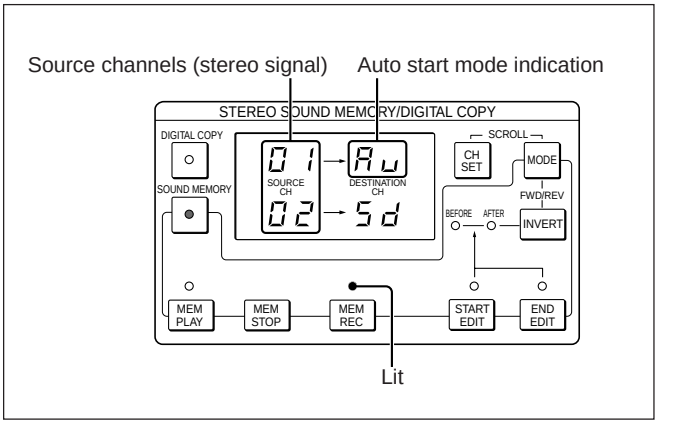


The tape address at which you pressed the MEM REC button appears on the LOCATE TIME display, and the CUE display shows "rS" (indicating the sound memory writing start point).



3 Begin playback or recording from a point before the writing source channel start address.

When the tape address shown on the TAPE TIME display matches the value of rS shown in the LOCATE TIME display, writing to the sound memory begins automatically. The MEM REC lamp changes from flashing to constantly lit.



Ending the writing to sound memory before the sound memory is full

Press the MEM STOP button.
The MEM REC lamp goes off.

If you do not press the MEM STOP button during writing

When the sound memory is full (after about 160 seconds for a mono signal, and 80 seconds for a stereo signal) writing automatically stops.
Thereafter the MEM REC lamp starts flashing, and the RM-3348HR returns to the writing standby state.

Exiting the writing standby state

Press the MEM STOP button.
The MEM REC lamp goes off.

Abandoning writing in progress

Press the MEM REC button.
The MEM REC lamp flashes, and the RM-3348HR returns to the writing standby state.

Notes on the rE register

When you start writing to the sounds memory in auto start mode, writing does not stop even if the tape address coincides with the value stored in the rE register (the sound memory writing end point), the tape address at which the MEM STOP button was pressed or at which the sound memory became full (the end point for writing to sound memory) is, however, saved in the rE register.

5-7-4 Using External Trigger Mode for Writing to Sound Memory

Before carrying out writing to the sound memory, be sure to check that you have carried out the preparations described in Section 5-7-1, "Preparations" (page 5-14).

Use the following procedure to write the source channel signal to sound memory using external trigger mode.

1 Press the MEM REC button.

The MEM REC lamp starts flashing, and the RM-3348HR goes into the writing standby state.

2 Input the external trigger signal.

When the signal becomes active, triggering the writing to sound memory, the MEM REC lamp changes from flashing to constantly lit.
The source channels are displayed, and the upper destination channel display shows "Et," indicating external trigger mode.

Ending writing to sound memory before the sound memory is full

Press the MEM STOP button.
The MEM REC lamp goes off.

If you do not press the MEM STOP button during writing

When the sound memory is full (after about 160 seconds for a mono signal, or 80 seconds for a stereo signal), writing automatically stops.
Thereafter the MEM REC lamp starts flashing, and the RM-3348HR returns to the writing standby state.

Exiting from the writing standby state

Press the MEM STOP button.
The MEM REC lamp goes off.

Retriggering during writing

Retriggering during writing is not possible.

For details on the retriggerable mode, see Section 5-6-1, "Trigger Modes" (page 5-12).

5-8 Playing Back From the Sound Memory

5-8-1 Preparations

Before carrying out playback from the sound memory, be sure to check that you have carried out the preparations described in Section 5-7-1, "Preparations" (page 5-14), and further check the playback direction by simultaneously pressing the MODE button and INVERT button.

For details on setting the playback direction, see Section 5-4-4, "Selecting the Sound Memory Playback Direction" (page 5-10).

5-8-2 Using Manual Mode for Playback from Sound Memory

Use the following procedure for playback from the sound memory using manual mode.

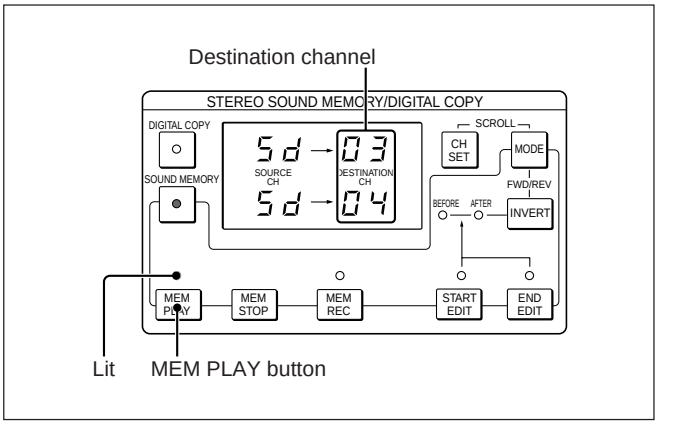
1 Press the INPUT button for the destination channel.

2 Begin tape playback.

3 Press the MEM PLAY button.

The MEM PLAY lamp lights, and playback starts from the sound memory editing start point (the value in the SA register).
The tape address at which the MEM PLAY button was pressed is saved as the sound memory playback start point (in the PS register).

For details on the sound memory editing start point (SA register) see Section 5-3-2, "Sound Memory Editing Start Point (SA) and End Point (EA)" (page 5-4), and for details on the sound memory playback start point (PS register) see Section 5-3-1, "Sound Memory Playback Start Point (PS)" (page 5-3).



Abandoning playback in progress

Press the MEM STOP button.
The MEM PLAY lamp goes off.

If you do not press the MEM STOP button during sound memory playback

Playback ends after about 160 seconds for a mono signal, and 80 seconds for stereo signal, and the MEM PLAY lamp goes off.

Restarting playback in progress from the beginning

Press the MEM PLAY button.

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5-8-3 Using Auto Start Mode for Playback from Sound Memory

Use the following procedure for playback from the sound memory using auto start mode.

1 Use either of the following methods to save a tape address in the PS register.

1) Play back from sound memory using manual mode.

For details, see Section 5-8-2, "Using Manual Mode for Playback from Sound Memory" (previous page).

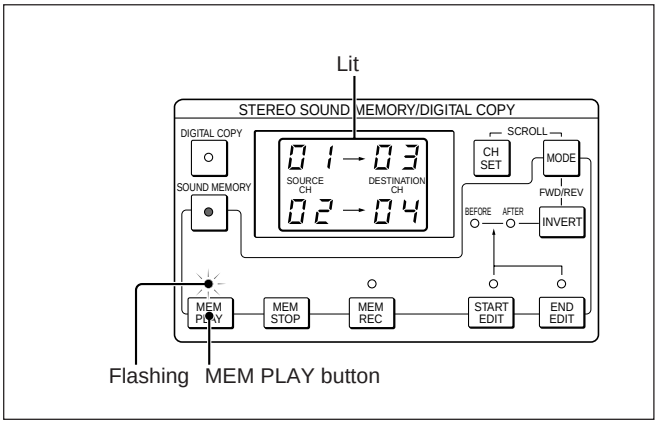
The tape address at which you pressed the MEM PLAY button is saved in the PS register.

2) Enter the required tape address on the LOCATE TIME display using the numeric buttons, and press the STORE and MEM PLAY button in that order.

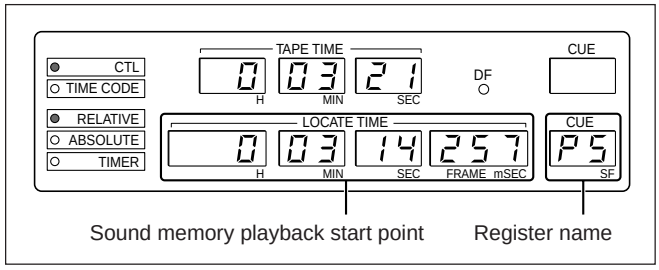
You cannot carry out playback from sound memory in the auto start mode unless there is a tape address in the PS register.

2 Press the MEM PLAY button.

The MEM PLAY lamp flashes, and the RM-3348HR enters the sound memory playback standby state.

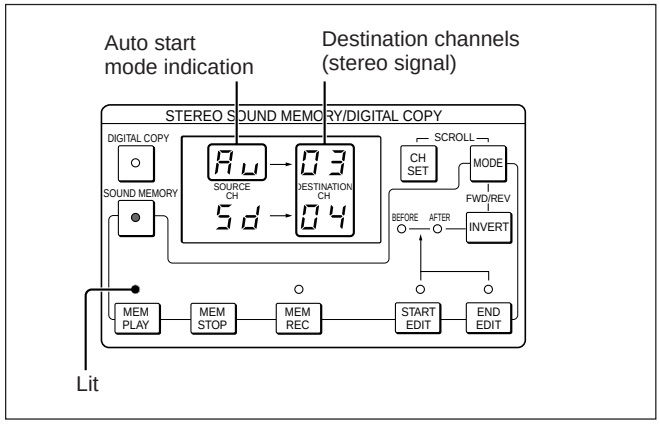


The tape address at which you pressed the MEM PLAY button appears on the LOCATE TIME display, and the CUE display shows "PS" (indicating the sound memory playback start point).



3 Begin playback, recording or rehearsal of the tape from before the target start address.

When the tape address shown on the TAPE TIME display matches the value of PS shown on the LOCATE TIME display, sound memory playback from the sound memory editing start point (the value in the SA register) begins automatically. The MEM PLAY lamp changes from flashing to constantly lit.



Ending playback from sound memory while in progress

Press the MEM STOP button.
The MEM PLAY lamp goes off.

If you do not press the MEM STOP button during sound memory playback

The sound memory playback stops automatically at the sound memory editing end point (the value in the EA register).

For details on the sound memory editing end point (EA register) see Section 5-3-2, "Sound Memory Editing Start Point (SA) and End Point (EA)" (page 5-4).

Exiting the sound memory playback standby state

Press the MEM STOP button.
The MEM PLAY lamp goes off.

5-8-4 Using External Trigger Mode for Playback from Sound Memory

Use the following procedure to play back from sound memory.

1 Press the MEM PLAY button.

The MEM PLAY lamp flashes, and the RM-3348HR enters the sound memory playback standby state.

2 Input the external trigger signal.

When the signal becomes active, it triggers playback from sound memory. Playback starts from the sound memory editing start point (the value in the SA register), and the MEM PLAY lamp changes from flashing to constantly lit. The destination channels are displayed, and the upper source channel display shows "Et," indicating external trigger mode.
For details on the sound memory editing start point (SA register) see Section 5-3-2, "Sound Memory Editing Start Point (SA) and End Point (EA)" (page 5-4).

When the non-retriggerable mode is selected

At the sound memory editing end point (the value in the EA register), sound memory playback stops, and the RM-3348HR returns to the sound memory playback standby state.
Even if the trigger signal goes active again during the playback, the playback does not stop.

When the retriggerable mode is selected

If the trigger signal goes active again during the sound memory playback, playback restarts from the sound memory editing start point (the value in the SA register).

Exiting the sound memory playback standby state

Press the MEM STOP button.
The MEM PLAY lamp goes off.

When a trigger signal is connected both to the PCM-3348HR and to the RM-3348HR

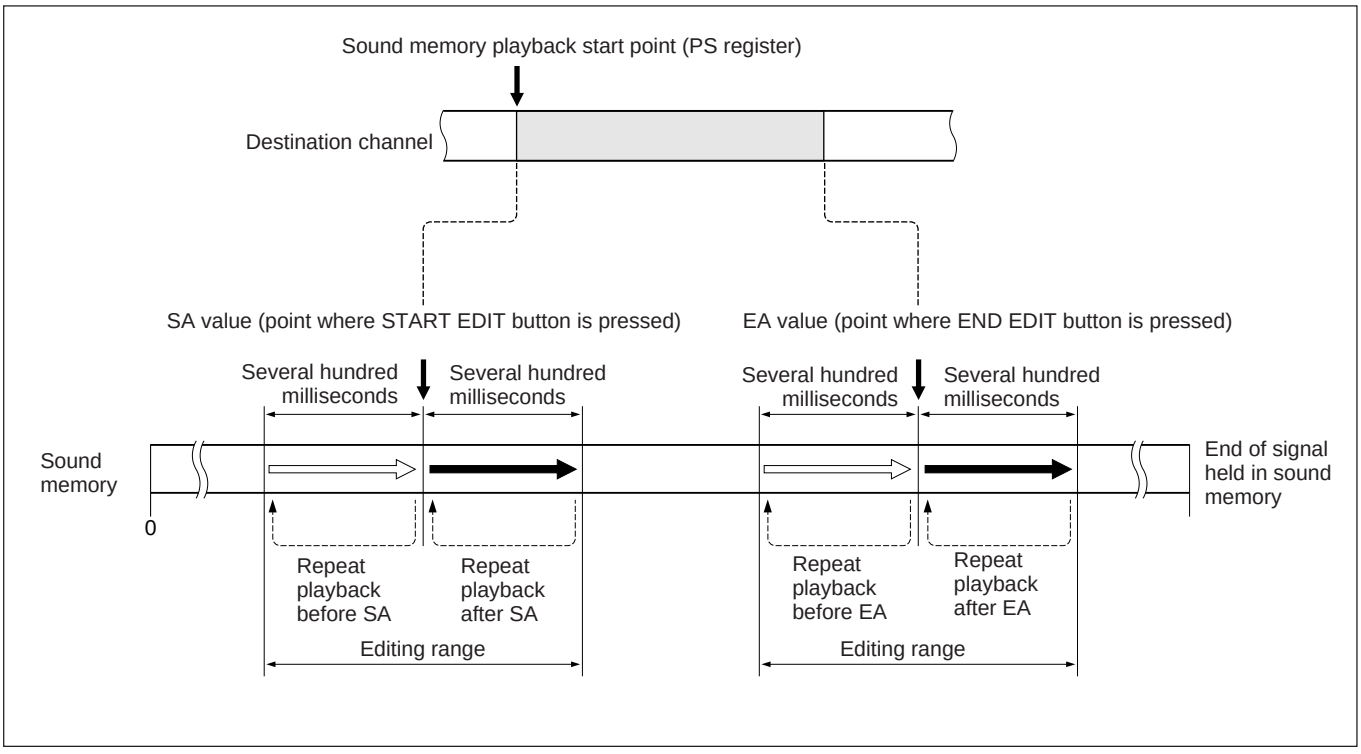
The trigger signal input to the RM-3348HR takes precedence.

For details, see the section "When a trigger signal is connected both to the PCM-3348HR and to the RM-3348HR" (page 5-13).

5-9 Sound Memory Editing

5-9-1 Overview of Sound Memory Editing

From the audio signal held in sound memory, you can extract a desired section to copy to the destination channel.
You can adjust the sound memory editing start point (value in SA register) and sound memory editing end point (value in EA register) while listening to the sound immediately before and after those points.


Sound memory playback start point (PS register)
Destination channel
SA value (point where START EDIT button is pressed)
EA value (point where END EDIT button is pressed)
Several hundred milliseconds
Several hundred milliseconds
Several hundred milliseconds
Several hundred milliseconds
Sound memory
0
End of signal held in sound memory
Repeat playback before SA
Repeat playback after SA
Repeat playback before EA
Repeat playback after EA
Editing range
Editing range

Sound memory editing

5-9-2 Carrying Out Sound Memory Editing

Use the following procedure to carry out sound memory editing.

1 Check that the source and destination channels are displayed.

2 Press the SF.mS/F.S button to select the units for adjusting the editing points.
Time code display mode: Frames
CTL display mode: Milliseconds or seconds

Note

When adjusting the memory editing points in the time code display mode, even if the time code chase mode is in subframe mode, it is not possible to make the adjustment in units of subframes.

3 **When you know the approximate address for the SA or EA value**

1) Use the numeric buttons to display the relative address within the sound memory of the sound memory editing start point (SA) or end point (EA) on the LOCATE TIME display, then press the STORE button.

If the value input exceeds the relative address of the end of the signal held in sound memory, the display value automatically changes to the signal end point address.

2) To store the start point (SA value), press the START EDIT button, and to store the end point (EA value), press the END EDIT button.

(Continued)

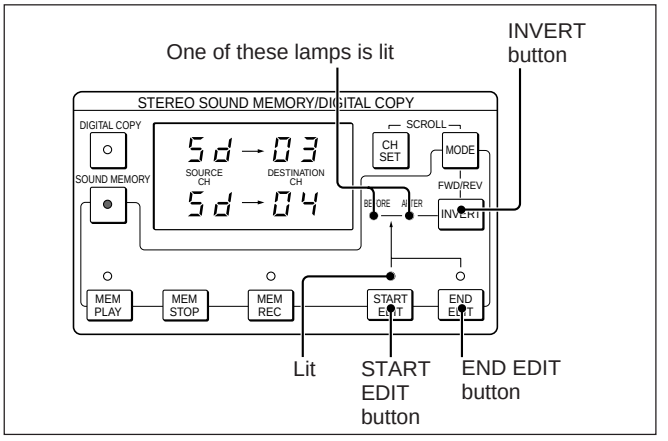
When you do not know the approximate address for the SA or EA value

To adjust the start point (SA value), play back from the sound memory, and press the START EDIT button at the required point.

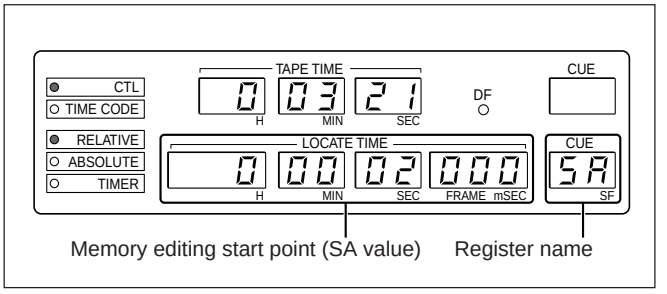
To adjust the end point (EA value), play back from the sound memory and press the END EDIT button at the required point.

The START EDIT or END EDIT lamp lights, and the section of sound immediately before or after the editing point plays back repeatedly.

When the section before the editing point is being played back, the BEFORE lamp is lit, and when the section after the editing point is being played back, the AFTER lamp is lit.



The LOCATE TIME display shows the relative address in sound memory of the editing point, and the CUE display shows the register name.



4 Press the INVERT button to toggle between playback before or after the editing point, as indicated by the BEFORE and AFTER lamps.

5 While listening to the repeat playback, adjust the editing point by pressing the START EDIT or END EDIT button simultaneously with the TRIM + or – button.

As you adjust an editing point, its new value is automatically saved in the SA or EA register.

6 When the adjustment is completed, press the MEM STOP button.

Retention of the contents of sound memory

The signal copied from a source channel into sound memory is held there as long as the PCM-3348HR remains on.

Changing the editing start point and end point has no effect on the contents of the sound memory, so after trimming off a section of sound, you can restore it if required.

Using the reverse playback direction

The contents of sound memory are accessed in reverse, so that the start editing point has a higher address than the end editing point, and for example, playback before an editing point produces the lead up to the editing point in the reverse direction, that is, the section with larger addresses.

Confirming the values of the editing start point, end point, and memory playback time

Press the RECALL button, followed by one of the following buttons:

- Editing start point (SA): START EDIT button
- Editing end point (EA): END EDIT button
- Memory playback time (Pt): SOUND MEMORY button

5-10 Time Shift Editing

5-10-1 Monitor Signal During Editing

Monitor signal for the destination channel

Press either the REPRO button or INPUT button for the destination channel to obtain the following monitor output.

REPRO button: Tape playback signal
INPUT button: Sound memory playback signal

5-10-2 Restoring the Channel Settings Before the Sound Memory Operation

By pressing the REC READY button for a channel not selected as the source channel or destination channel, you can carry out normal recording in parallel with a sound memory operation.

Use the following procedure to restore the channel settings before the sound memory operation.

1. Before pressing the SOUND MEMORY button, save the channel settings using the buttons in the SET UP MEMORY block.

   For details on how to save the channel settings, see the section "Saving the channel settings" (page 4-8).

2. Press the SOUND MEMORY button, setting all channels to the recording inhibited state.

3. After setting the source and destination channels, press the button in the SET UP MEMORY block used in step 1 to retrieve the channel settings.

   This returns the settings of channels other than the source and destination channels to their state before pressing the SOUND MEMORY button.

   For details on how to recall the channel settings, see the section "Recalling the channel settings" (page 4-8).

Restoring the channel settings while the SOUND MEMORY button was lit

When you press the SOUND MEMORY button, turning it off, all channels go to the recording inhibited state. To restore the channels to the state before you turn off the SOUND MEMORY button, first save the channel settings using the buttons on the SET UP MEMORY block. Then after pressing the SOUND MEMORY button, turning it off, retrieve the channel settings from the memory.

5-10-3 Saving the Punch-In Point and Punch-Out Point

Use the following procedure to save the punch-in point and punch-out point.

1 Listening to playback sound from the tape, press the CUE STORE button at the point to begin copying to the destination channel.

This saves the copy start point address in the cue point register.

2 Press and light the RECALL button, then enter the number of the cue point register used in step **1** on the numeric buttons.

This displays the address saved in step **1** in the LOCATE TIME display.

3 Press the STORE and IN buttons in that order.

This saves the address saved in step **1** as the punch-in point address in the IN point register.

4 Press the RECALL, IN, +, RECALL, SOUND MEMORY, =, STORE, and OUT buttons, in that order.

This adds the memory playback time to the address of the punch-in point, saving the result as the punch-out point in the OUT point register.

5 Press the RECALL, IN, STORE and MEM PLAY buttons in that order.

This saves the punch-in point as the sound memory playback start point (value of PS).

5-10-4 Carrying Out Rehearsal and Time Shift Editing

Use the following procedure to carry out time shift editing.

1 Press the MODE button repeatedly until the channel display shows "Au."

This means that the sound memory operation mode is the auto start mode.

2 Press the MEM PLAY button.

The MEM PLAY lamp flashes, and the RM-3348HR enters the sound memory playback standby state.

3 Press the REPRO button for the destination channel.

4 Press the AUTO PUNCH button.

The tape begins playback from the preroll point, and carries out a rehearsal between the punch-in point and punch-out point.
At the punch in point, the destination channel playback signal fades out, while the sound memory playback signal fades in, and then at the punch-out point, the sound memory playback signal fades out, while the destination channel playback signal fades in.
Use the rehearsal function to check the editing effect, and as necessary adjust the cross fade time (see Section 3-2, "Setting the Cross Fade Time") or editing points (see Section 5-10-5, "Adjusting the Editing Points").

5 Holding down the REC button, press the AUTO PUNCH button.

This records the playback signal from sound memory on the destination channel between the punch-in point and punch-out point.

5-10-5 Adjusting the Editing Points

Before carrying out the adjustment, use the procedure in step **1** of Section 5-10-4, "Carrying Out Rehearsal Time Shift Editing" to select the auto start mode.

Adjusting the punch-in point

Use the following procedure to adjust the punch-in point.

1 Press and light the REPRO button for the destination channel.

2 Press the AUTO PUNCH button.

The rehearsal begins. If required, correct the punch-in point using the procedure described in Section 4-4-3, "Correcting the Punch-In/Out Points" on page 4-16.

3 Press the RECALL, IN, STORE and MEM PLAY buttons in that order.

This saves the adjusted punch-in point as the sound memory playback start point (in the PS register).

Adjusting the punch-out point

Use the following procedure to adjust the punch-out point.

1 Press the MEM PLAY button.

The MEM PLAY lamp flashes, and the RM-3348HR enters the sound memory playback standby state.

2 Press and light the REPRO button for the destination channel.

3 Press and light the REPRO MUTE button.

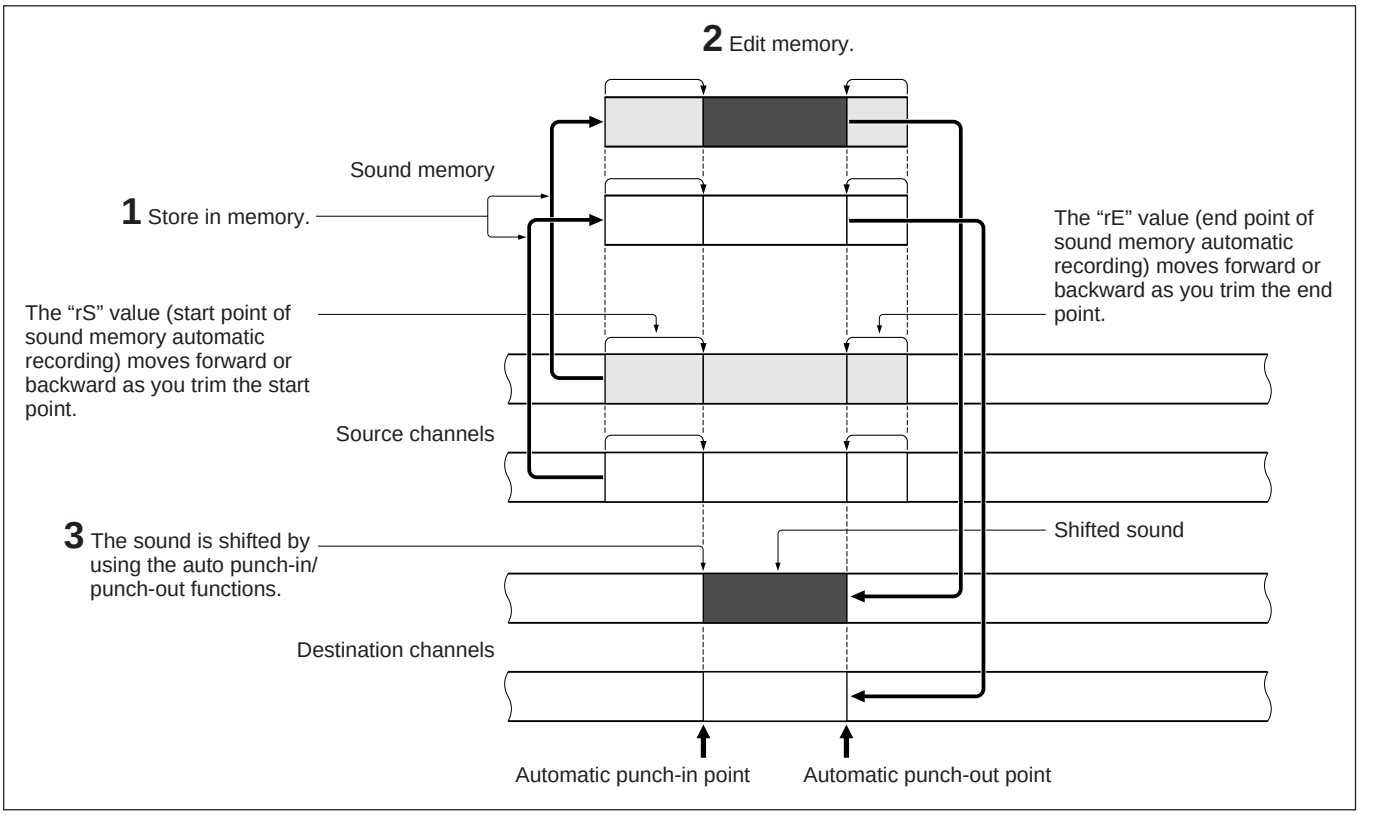
4 Press the AUTO PUNCH button.

This carries out a sound memory playback rehearsal between the punch-in point and punch-out point on the destination channel.
If required, correct the punch-out point using the procedure described in Section 4-4-3, "Correcting the Punch-In/Out Points" on page 4-16.

5 After adjusting the punch-out point, press the REPRO MUTE button, turning it off.

5-10-6 Copying an Audio Signal to the Same Address on Another Channel

This editing shifts the sound in memory to a portion having the same address on the source channel. See the figure below.


2 Edit memory.
Sound memory
1 Store in memory.
The "rE" value (end point of sound memory automatic recording) moves forward or backward as you trim the end point.
The "rS" value (start point of sound memory automatic recording) moves forward or backward as you trim the start point.
Source channels
3 The sound is shifted by using the auto punch-in/ punch-out functions.
Shifted sound
Destination channels
Automatic punch-in point
Automatic punch-out point

Editing the sound memory

By following the steps in the Flowchart in the Section 5-9-1 "Overview of Sound Memory Editing," you can select a portion to be shifted from the sound stored in the memory. At the same time, memory editing defines the start point address ("SA") and the end point address ("EA") for memory playback.

- The "rS" value (start point address for the sound memory automatic recording) and "rE" value (end point address for the sound memory automatic recording) are the addresses on the tape: When the MEM REC button is pressed, the tape time address where the button was pressed is stored in the "rS" register. When the MEM STOP button is pressed or when the memory capacity is reached, the tape time address where memory recording stopped is stored in the "rE" register.

During memory editing, in synchronization with the trimming of "SA" or "EA," the unit moves "rS" (or "rE") to the new address and stores it as the new "rS" (or "rE") point.

- To check the final "rS" and "rE" address on the tape for the source channel, retrieve the "rS" (or "rE") address by pressing the RECALL button followed by the MEM REC (or MEM STOP) button.
  By using this function, you can shift a desired sound from the source channel to the destination channel at the same address on the tape.

Storing the punch-in point and punch-out points

To store the punch-in point and punch-out point, follow the procedure below.

1 To store the start point for sound memory automatic recording ("rS") in the IN point register, press the RECALL, MEM REC, STORE and IN buttons in that order.

2 To store the end point for sound memory automatic recording ("rE") in the OUT point register, press the RECALL, MEM STOP, STORE and OUT buttons in that order.

Storing the start point for memory playback

To align the "rS" point with the "PS" point, press the RECALL, MEM REC, STORE, and MEM PLAY buttons in that order.

Note

The procedures required for rehearsing and executing time shift editing and trimming punch-out points are the same as those discussed in the preceding section.

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6-1 Overview

The digital copy function makes a copy of the digital audio signal from one channel to another, with no time delay.
There are three modes for the digital copy function, as follows.

- **Two-channel mode**
  This allows a digital copy from up to two source channels to up to two destination channels.

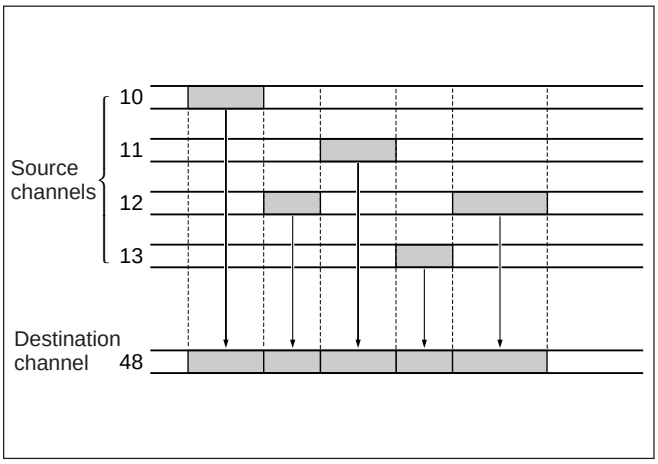
- **Multi-channel mode**
  This allows a digital copy from up to 48 source channels to up to 48 destination channels.

The combinations of source and destination channels depend on the mode selected (two-channel mode or multi-channel mode), as shown in the following table.

Channel combination and operation mode

Channel combination	Two-channel mode	Multi-channel mode
Copying from a channel to itself 5→5	Not possible	Not possible
Copying from two channels to a single channel 3→7 4→7	Not possible	Not possible
Copying from two channels to two other channels 1→5 12→3	Possible	Possible
Copying from a single channel to two channels 1→3 1→4	Possible	Not possible
Copying channels 1 to 24 to channels 25 to 48 1→25 2→26 3→27 ... 24→48	Not possible	Possible
Rearranging all 48 channels 1→2 2→3 3→4 ... 48→1	Not possible	possible

- **Vocal select mode**
  This allows a digital copy from any source channel to any part of a destination channel.



6-2-1 Selecting the Digital Copy Mode

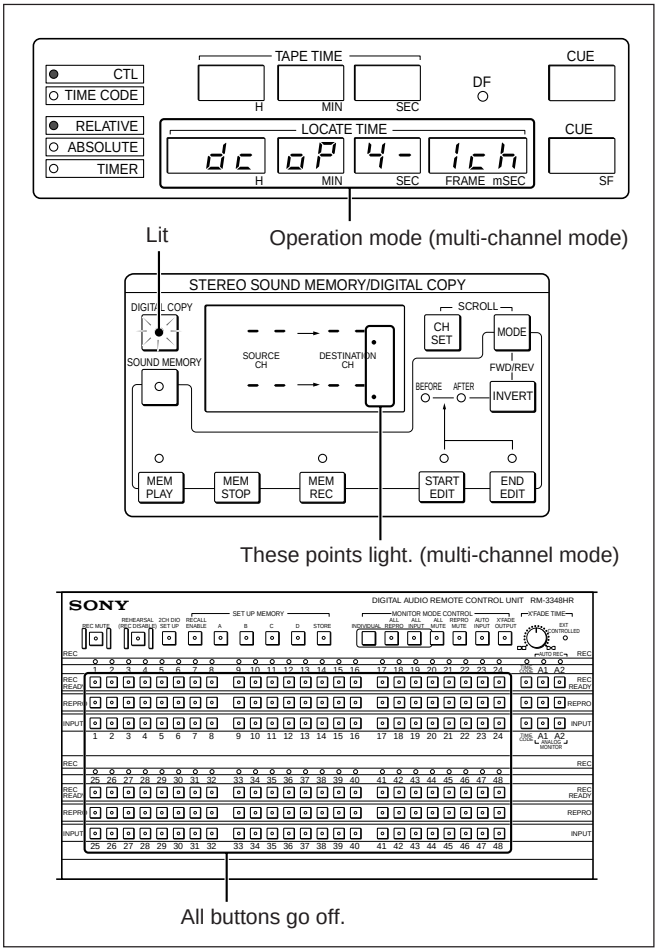
Use the following procedure to select the digital copy mode.

1 Set the REC MODE switch on the PCM-3348HR system control block to INSERT.

2 Stop the tape transport.

3 Press and light the DIGITAL COPY button.

The LOCATE TIME display shows "dcoPY-1ch" for about two seconds.
The REC READY, REPRO and INPUT buttons for all channels go off, and all channels go into the recording inhibited state.



Making a digital copy during rehearsal or recording

During rehearsal or recording, the DIGITAL COPY button does not operate.

Notes on the REC MUTE button

- If you press the DIGITAL COPY button while REC MUTE button is lit, the REC MUTE button goes off, and the unit exits from the REC MUTE state.
- While the DIGITAL COPY button is lit, the REC MUTE button does not operate.

6-2-2 Selecting the Operation Mode

Selecting the multi-channel mode

Press the 0, STORE, = and 3 buttons in that order.

The LOCATE TIME display shows "dcoPY-1ch" for about two seconds. The trailing dots also light on the destination channel display.

Selecting the two-channel mode

Press the 1, STORE, = and 3 buttons in that order.

The LOCATE TIME display shows "dcoPY-2ch" for about two seconds. The trailing dots do not light on the destination channel display.

Selecting the vocal-select mode

Press the 2, STORE, = and 3 buttons in that order.

The LOCATE TIME display shows "VocAL-SEL" for about two seconds.

Checking the operation mode

Press the RECALL, = and 3 buttons in that order.

The LOCATE TIME display shows "dcoPY-1ch" (multi-channel mode), "dcoPY-2ch" (two-channel mode) or "VocAL-SEL" (vocal-select mode) for about 2 seconds.

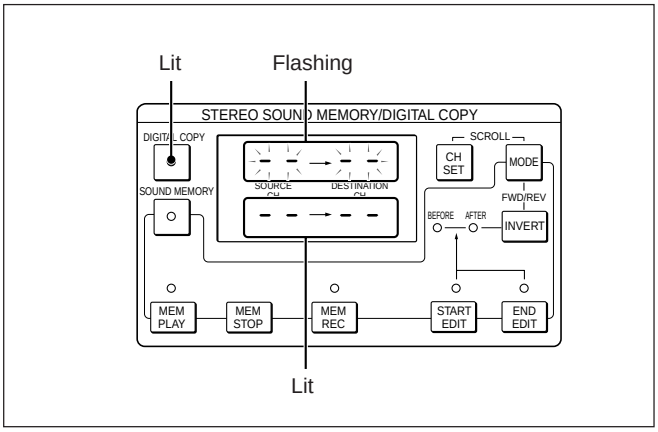
Notes on changing the operation mode

- Changing the operation mode deletes the existing channel settings, and the channel display shows "– –" .
- It is not possible to change the operation mode during rehearsal or recording.

6-3 Selecting the Source and Destination Channels

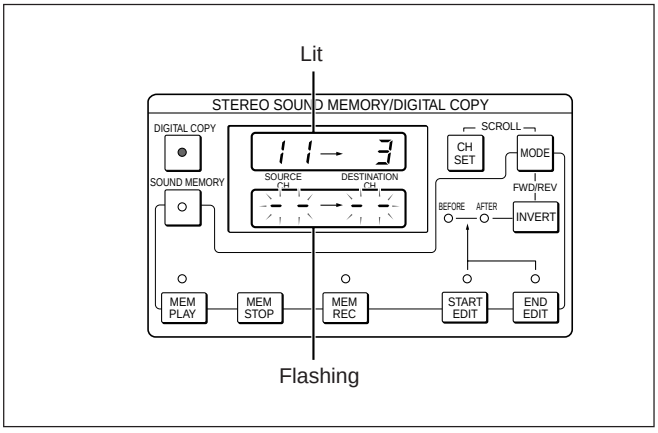
6-3-1 Operation in Two-Channel Mode

1 Check that the DIGITAL COPY button is lit.



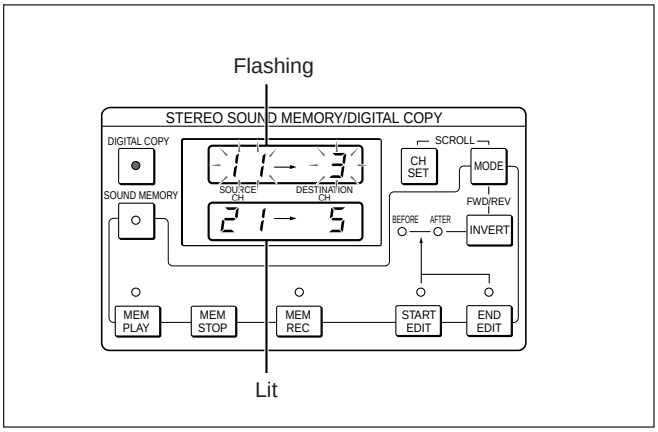
2 Press the REPRO button of the source channel and the REC READY button of the destination channel.

The first source-destination channel pair appears on the upper channel display.
To carry out a copy of only a single channel, skip to step **4**.



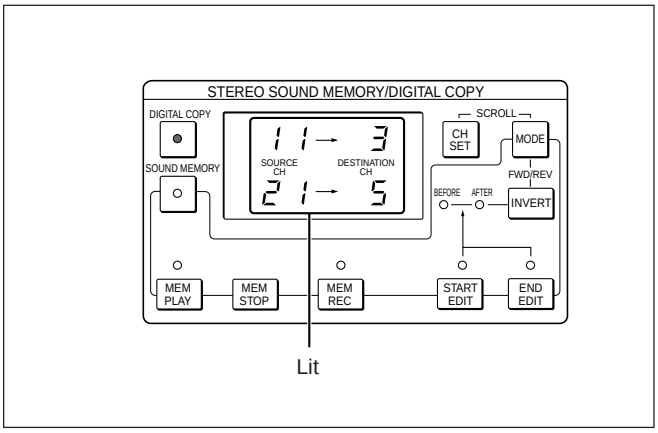
3 Press the REPRO button of the second source channel and the REC READY button of the second destination channel.

The first channel pair flashes, and the second channel pair lights continuously.



4 Press the CH SET button.

All of the channel display indications light continuously, and the channel selection is confirmed.
The REPRO button of the source channel and the REC READY button of the destination channel flash.



Changing the channels during the input operation

While the channel display is flashing, press the REPRO button or REC READY button for another channel.

Notes on channel settings in the digital copy function

- It is not possible to set a channel other than the destination channel in the recording ready state.
- It is not possible to monitor the input signal of the source channel or destination channel.
- The AUTO INPUT, ALL REPRO and ALL INPUT buttons do not operate.

Changing or deleting channels after completing the settings

Use the following procedure to change or delete channels after completing the settings.

1 Press the CH SET button.

The upper or lower channel display flashes.
If the channel pair you wish to delete or change is not flashing, press the CH SET button twice more. This switches so that the other channel display flashes.

2 **To change the channels**
Press the REPRO button for the new source channel or REC READY button for the new destination channel.

To delete the channels
Press the REPRO button for the source channel whose display is flashing, then press the REC READY button for the corresponding destination channel.

3 After making the change or deletion, press the CH SET button.

Deleting all channel pairs

Press the DIGITAL COPY button, turning it off.

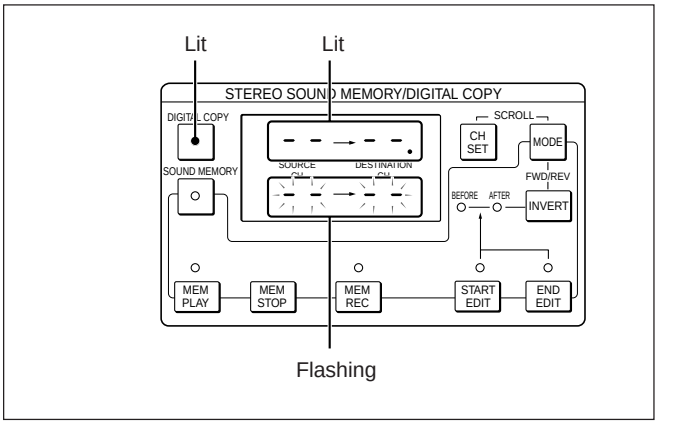
6-3-2 Operation in Multi-Channel Mode

This section describes the operations required for an example operation in which the source and destination channels are set as follows.

Source channel	→	Destination channel
3	→	6
9	→	11
17	→	20

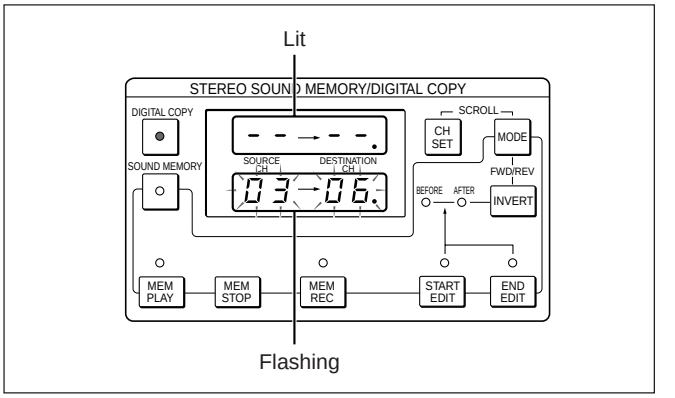
Use the following procedure to make the above channel settings.

1 Check that the DIGITAL COPY button is lit, and that the points on the destination channel display are lit.



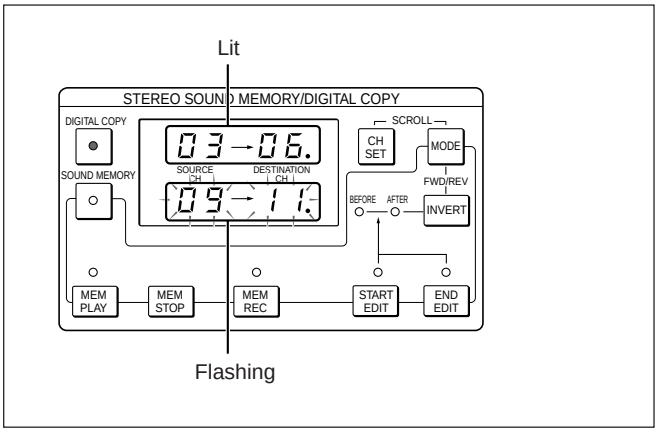
2 Press the REPRO button of the source channel (3) and the REC READY button of the destination channel (6).

The selected channel numbers appear flashing on the lower channel display. To carry out a copy of only a single channel, skip to step **5**.



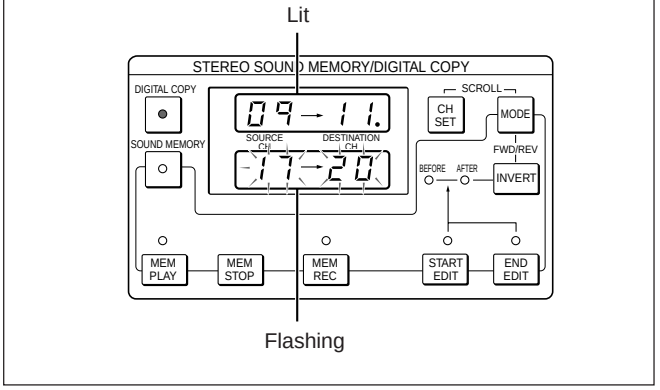
3 Press the REPRO button of the second source channel (9) and the REC READY button of the second destination channel (11).

The display of the first pair of channel numbers moves to the upper display, and lights continuously. The second pair of channel numbers appear flashing on the lower channel display.



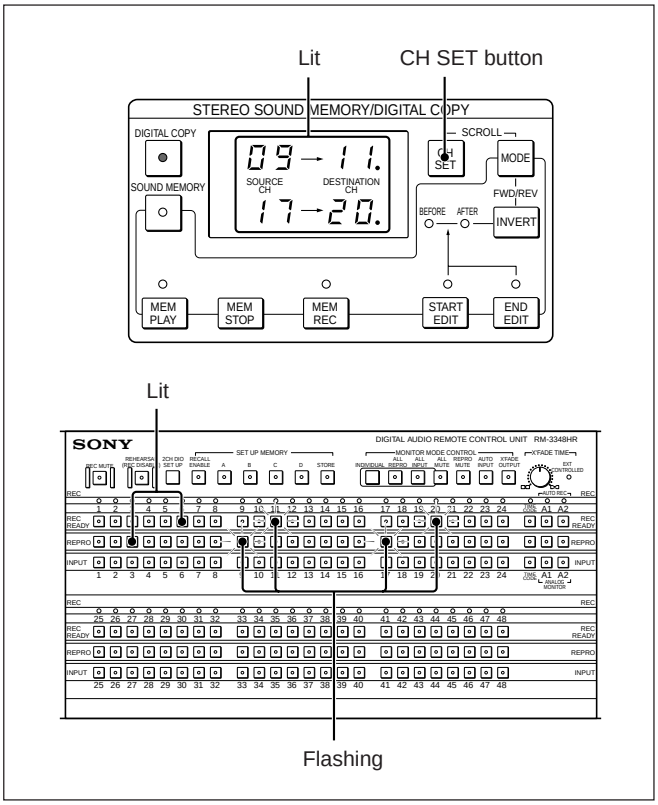
4 Press the REPRO button of the third source channel (17) and the REC READY button of the third destination channel (20).

The display of the second pair of channel numbers moves to the upper display and lights continuously. The third pair of channel numbers appear flashing on the lower channel display.
To set fourth and subsequent channel pairs, repeat this step as necessary.



5 Press the CH SET button.

The channel display indications which were flashing light continuously, and the channel selection is confirmed.
The REPRO button or REC READY button of a selected channel whose number is not displayed lights continuously, and the REPRO button or REC READY button of a selected channel whose number is displayed flashes.



Checking all channel selections

Pressing the CH SET button and MODE button simultaneously scrolls the channel display.
This scrolling operation is effective both during and after channel setting.

Checking a specific channel selection which is not displayed

1 Press the CH SET button.

The previously lit channel display starts flashing.

2 Press the lit one of the REPRO and REC READY buttons for the channel you wish to check.

The channel pair including this channel appears in the lower channel display, and the REPRO button or REC READY button for each displayed channel flashes.

3 After completing the check, press the CH SET button again.

Note on deleting wrongly selected channels

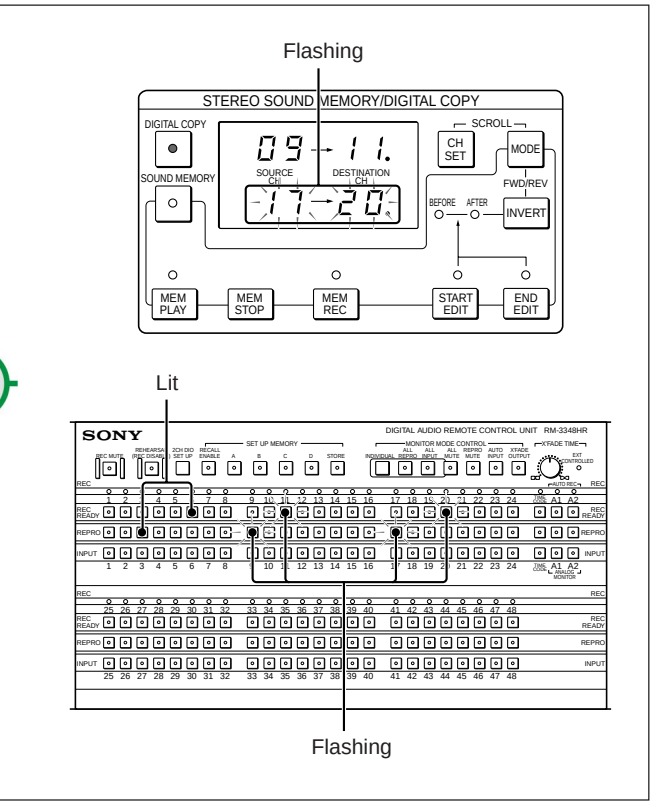
When you press the REPRO button to check a source channel in step **2** above, note that pressing the REC READY button for the corresponding destination channel deletes the source-destination channel pair. Similarly, when you press the REC READY button to check a destination channel in step **2** above, pressing the REPRO button for the corresponding source channel deletes the source- destination channel pair.

Changing the selected channels

The following is the procedure to change source channel 3 to channel 1, by way of example.

1 Press the CH SET button.

The lower channel display flashes. Of the channels selected, the REPRO button or REC READY button flashes for those channels which are displayed, and is continuously lit for those channels which are not displayed.



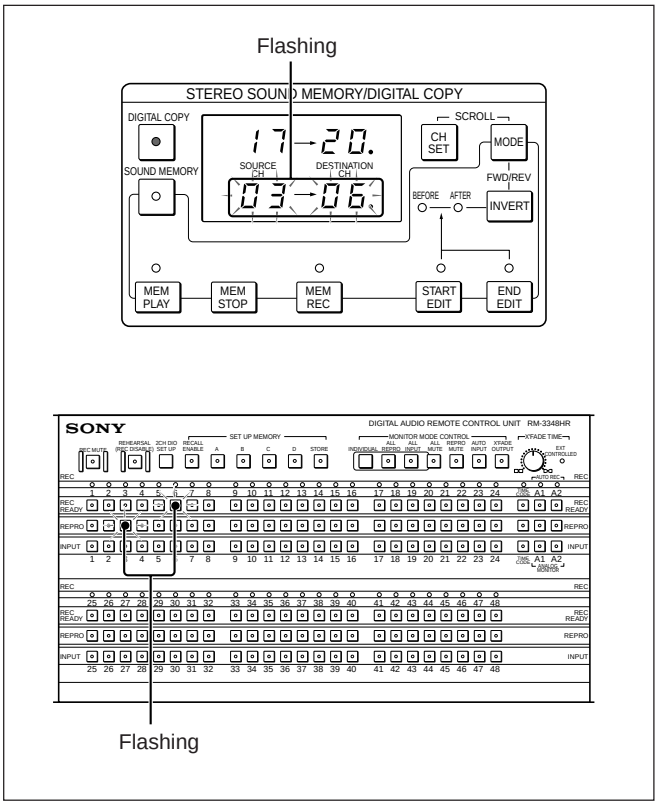
2 Changing a source channel

Press the REC READY button for the destination channel (6) paired with the source channel (3) you wish to change.

Changing a destination channel

Press the REPRO button for the source channel paired with the destination channel you wish to change.

The source-destination channel pair to be changed appears flashing o n the lower channel display.



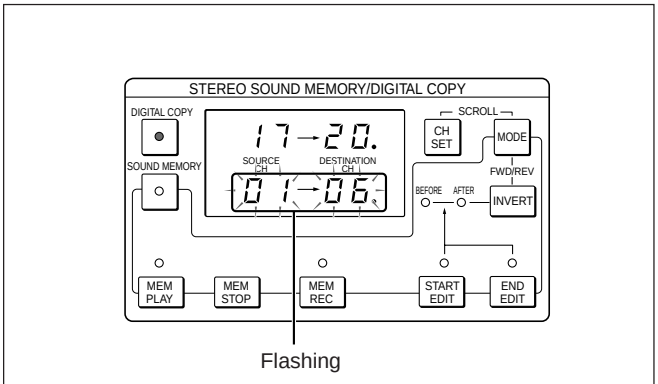
3 Changing a source channel

Press the REPRO button for the new source channel (1) .

Changing a destination channel

Press the REC READY button for the new destination channel.

The changed source-destination channel pair appears flashing on the lower channel display.



4 Press the CH SET button.

This confirms the new settings, and the channel display changes from flashing to constantly lit.

Note on deleting wrongly selected channels

When you press the REPRO button to recall a source channel in step **2** above, note that pressing the REC READY button for the corresponding destination channel deletes the source-destination channel pair. Similarly, when you press the REC READY button to recall a destination channel in step **2** above, pressing the REPRO button for the corresponding source channel, this deletes the source- destination channel pair.

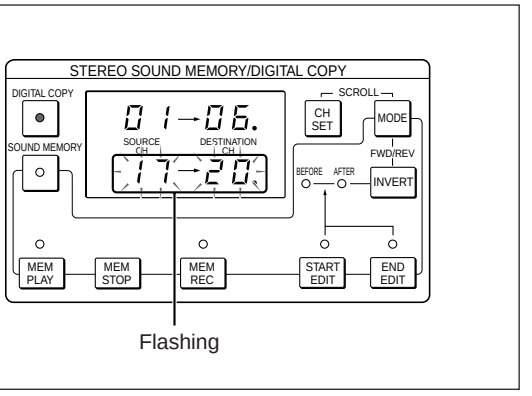
Deleting a source-destination channel pair

The following is the procedure to delete the combination of source channel 17 and destination channel 20, by way of example.

1 Press the CH SET button.

2 Press the REPRO button of the source channel (17) or the REC READY button of the destination channel (20) for the source- destination channel pair you wish to delete.

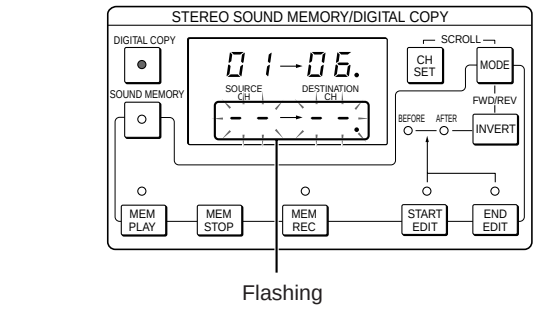
The source-destination channel pair appears flashing on the lower channel display.



3 **If you pressed the REPRO button of the source channel (17) in step 2**
Press the REC READY button for the destination channel (20) of the source-destination channel pair selected.

If you pressed the REC READY button of the destination channel (20) in step 2
Press the REPRO button for the source channel (17) of the source- destination channel pair selected.

This deletes the selected source-destinaion channel pair, and the lower channel display shows "––" flashing.
The source channel REPRO button and destination channel REC READY button for the deleted source-destination channel pair go off.



4 After completing the deletion, press the CH SET button.

The channel display changes from flashing to constantly lit.

Deleting all of the source-destination channel pairs

To continue in multi-channel mode, press the 0, STORE, = and 3 buttons in that order.
To change to two-channel mode, press the 1, STORE, = and 3 buttons in that order.

This resets the operation mode, and deletes all existing source- destination channel pair settings.

6-4 Carrying Out a Digital Copy

6-4-1 Procedure for Digital Copy Operation

After completing the channel settings, with the DIGITAL COPY button still lit, carry out either a normal insert recording or auto punch in/out operation. This carries out the digital copy between the selected pairs of channels.
When the digital copy ends, press the DIGITAL COPY button, turning it off.

Restoring the channel settings after the digital copy ends

- In two-channel mode, if you press the DIGITAL COPY button, turning it off after making the channel settings, all the channel settings are lost.
- In multi-channel mode, if you press the DIGITAL COPY button, turning it off after making the channel settings, the channel settings are preserved. Pressing the DIGITAL COPY button again, turning it on, restores the settings.
- You can also carry out normal recording in parallel with the digital copy operation.

6-4-2 Selecting the Monitor Signal

The following signals are the monitor output signals during a digital copy.

Monitor output during a digital copy

Channel	Monitor signal selection button	Monitor signal
Source channel	Only the REPRO button is effective.	Source channel tape playback signal
Destination channel	REPRO button	Destination channel tape playback signal
	INPUT button	Source channel tape playback signal
Other channels	REPRO button	Tape playback signal
	INPUT button	Line input signal

Notes on monitor signal settings

- For the source channel, the ALL INPUT button, AUTO INPUT button, and INPUT button do not function.
- For the destination channel, all of the monitor signal selection buttons operate, but even if you select the input signal monitor state, it is not possible to monitor the line input signal.

6-4-3 Restoring the Channel Settings Before the Digital Copy Operation

Use the following procedure to restore the channel settings before the digital copy operation.

1 Before pressing the DIGITAL COPY button, use the buttons in the SET UP MEMORY panel to save the channel settings.

For details on how to save the channel settings, see the section "Saving the channel settings" (page 4-8) .

2 Press the DIGITAL COPY button.

This sets all channels to the recording inhibited state.

3 After setting the source and destination channels, press the button on the SET UP MEMORY panel used in step **1**, to recall the channel settings.

This returns the settings of all channels other than the source and destination channels to their state before pressing the DIGITAL COPY button.

For details on how to recall the channel settings, see the section "Recalling the channel settings" (page 4-8) .

If a single channel is set both to the recording ready state and as a destination channel

If a channel was previously in the recording ready state, and is thus restored in step **3** above, and is simultaneously set as a digital copy destination channel, the destination channel setting takes precedence.

Restoring the channel settings after the digital copy ends

When the digital copy ends, and you press the DIGITAL COPY button, turning it off, all channels go to the recording inhibited state. To restore the channels to the state before turning off the DIGITAL COPY button, first, while the DIGITAL COPY button is still lit, save the channel settings using the buttons on the SET UP MEMORY panel. Then after pressing the DIGITAL COPY button, turning it off, recall the channel settings from the memory.

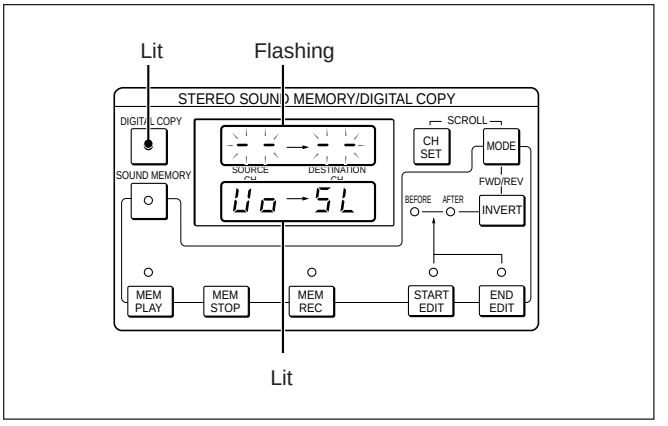
6-5-1 Selecting the Source and Desination Channels

The following is the procedure for selecting source channel 11 and destination channel 3.
For the Vocal select mode setting, see "6-2-2 Selecting the Operation Mode" on page 6-2.

1 Check that the tape stops.

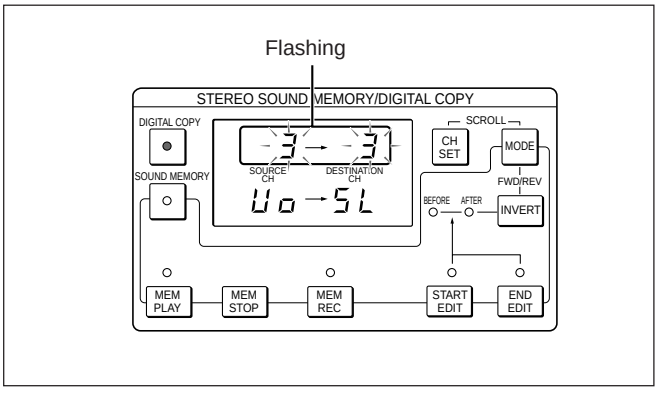
2 Check that the vocal-select mode is selected.

3 Check that the DIGITAL COPY button is lit.



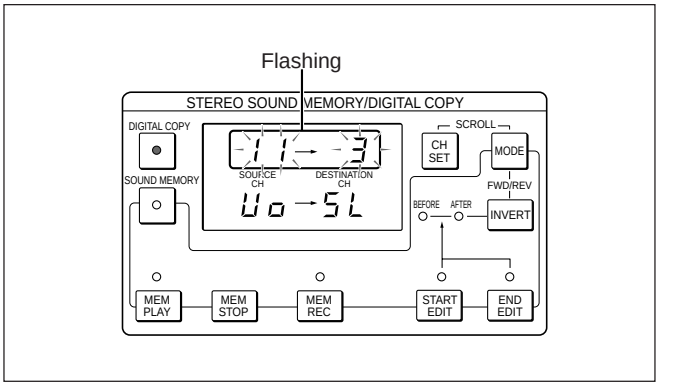
4 Press the REC READY button of the destination channel (3).

The selected channel appears on the upper channel display. Once a destination channel is selected, the same channel is automatically selected as a source channel.



5 Press the REPRO button of the source channel (11).

The selected channel appears on the upper channel display.



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6-5-2 Procedure for Vocal Select Operation

Carrying out vocal select

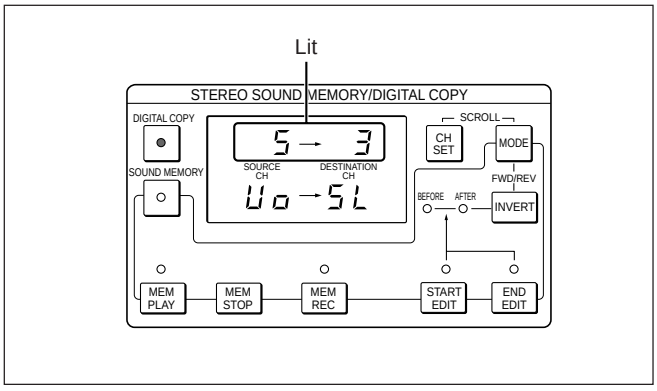
After completing the channel settings, with the DIGITAL COPY button still lit, press the PLAY button while holding down the REC (REH) button. Digital copying (or rehearsal) begins between the selected pairs of channels.

Notes

- You can not perform normal recording while carrying out vocal select.
- The destination channel cannot be changed during the vocal select operation (rehearsal) even if you press the REC READY button.

Changing a source channel during vocal select

Press the REPRO button of a new souce channel. For example, to copy channel 5, press the REPRO button of channel 5. The selected channel appears on the upper source channel display.



Ending vocal select

Press the PLAY, STOP, FF or REW button. Digital copying (or rehearsal) ends, and the operation corresponding to the pressed button begins. The source channel REPRO button, destination channel REC READY button, and the channels on the channel display flash.

Terminating vocal-select mode

Press the DIGITAL COPY button, turning it off. This sets all channels to the recording inhibited state.

6-5-3 Restoring the Channel Settings Before the Digital Copy Operation

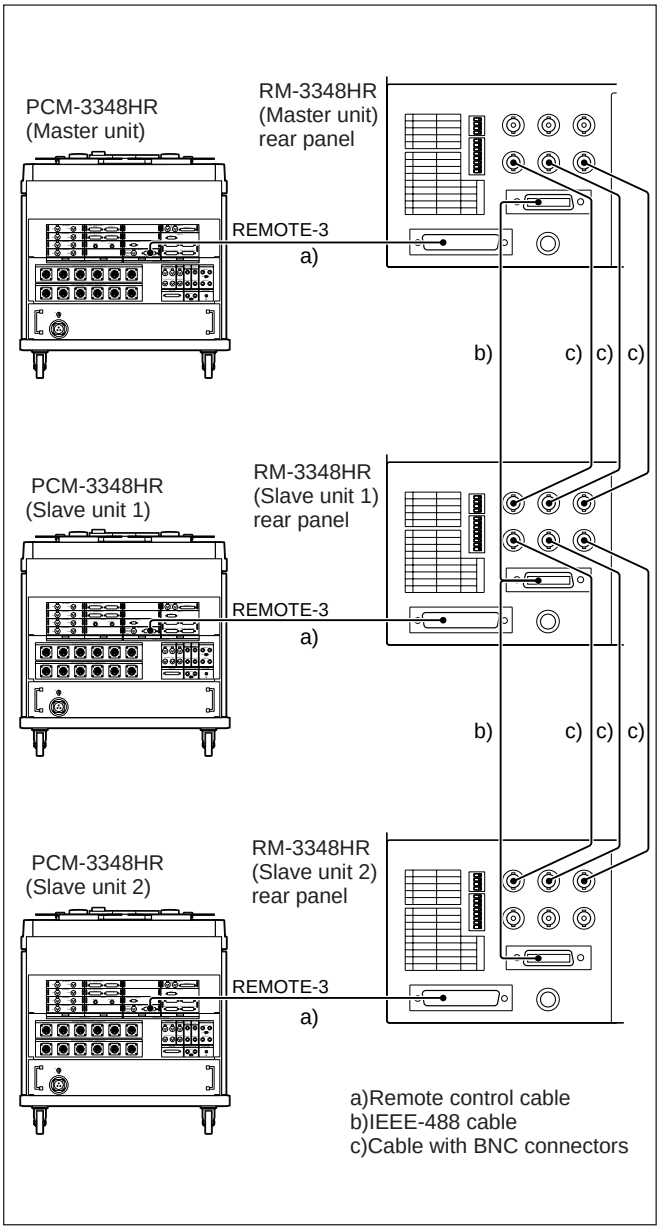
The procedure to restore the channel settings before the vocal select operation is the same as that for digital copy operation. See “6-4-3 Restoring the Channel Settings Before the Digital Copy Operation” (page 6-9).

7-1 Sector-Based Synchronization

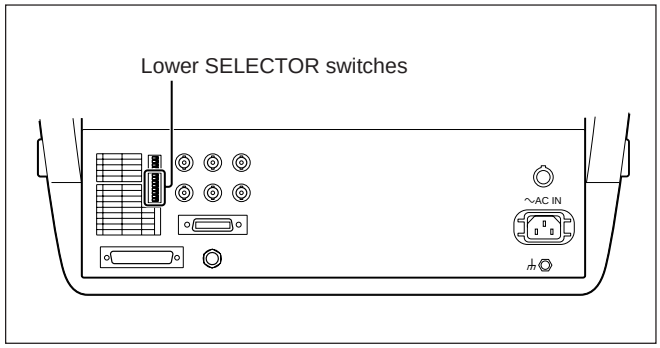
Using the RM-3348HR units, you can connect two or three PCM-3348HR units together for sector-based synchronized operation.

7-1-1 Connections and Preparations

1 Connect the PCM-3348HR and RM-3348HR units as follows.



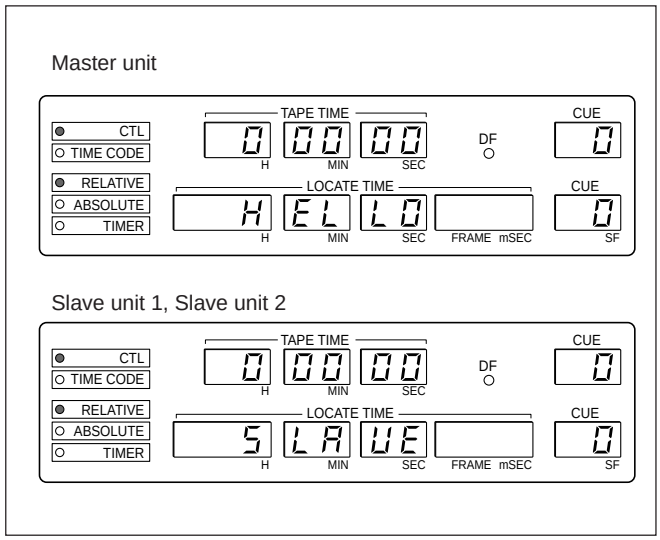
2 Set lower SELECTOR switch No.2 on the rear panel of each of the RM-3348HR unit as follows.
Master unit: ON (MASTER)
Slave unit 1: OFF (SLAVE)
Slave unit 2: OFF (SLAVE)



3 Power on the three PCM-3348HR unit and the two slave RM-3348HR units.

4 Finally power on the master RM-3348HR unit.

The following displays appear on each of the RM-3348HR for a few seconds.



Note

The SELECTOR switches No.4 to No.8 on the rear panel of the RM-3348HR for setting IEEE 488 device address are normally set as follows.

Master unit: 0H (Nos. 4 to 8: OFF)
Slave unit 1: 1H (Nos. 4 to 7: OFF, No.8: ON)
Slave unit 2: 2H (Nos. 4 to 6: OFF, No.7: ON, No.8: OFF)

7-1-2 Carrying Out Synchronized Operation

This section assumes the following synchronization points, by way of example.

Master unit: 00 H01MIN00SEC000mSEC
Slave unit 1: 00 H01MIN10SEC000mSEC
Slave unit 2: 00 H00MIN55SEC000mSEC

1 Mount a tape with a CTL signal recorded on it on each of the PCM-3348HR units.

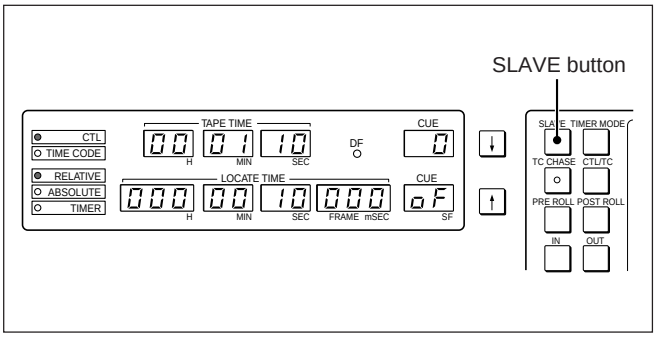
2 For all units, set the REC MODE switch on the PCM-3348HR system control block to INSERT.

3 Set the timer display mode on all of the RM-3348HR units to CTL absolute or CTL relative display mode.

4 Stop the tape on each PCM-3348HR unit at the point to be synchronized.

5 On the RM-3348HR slave unit 1, press and light the SLAVE button.

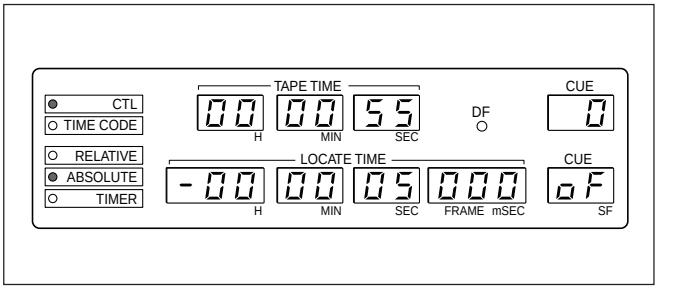
This automatically computes the sync offset time (10 seconds) for slave unit 1, and shows it in the LOCATE TIME display.



For a few seconds, until synchronization is achieved, the REMOTE 3 lamp of the SYNC CLOCK switch on the PCM-3348HR system control block flashes, and the EXT CLOCK ERROR lamp lights, but then automatically the REMOTE 3 lamp changes to light continuously, and the EXT CLOCK ERROR lamp goes off.

6 Press the SLAVE button on the RM-3348HR slave unit 2.

This automatically computes the sync offset time (–5 seconds) for slave unit 2, and shows it in the LOCATE TIME display.
The PCM-3348HR SYNC CLOCK switch automatically switches to REMOTE 3.



The above operations start synchronized operation of the PCM-3348HR. O nce synchronized operation starts, the tape transport of all three units is under the control of the RM-3348HR for the master unit, and on the slave PCM-3348HR and RM-3348HR units all tape transport buttons except the STOP button (that is, FF, REW and PLAY buttons) are disabled.
Pressing the STOP button on one of the slave RM-3348HR units releases that unit from the slave mode.

If the SLAVE button does not operate

If pressing the SLAVE button produces an indication "ILLG" on the LOCATE TIME display, it means that the synchronized operation mode cannot be selected. This occurs in the following cases.

- When the tape transport on the master or slave PCM-3348HR unit is not stopped.
- If the sampling frequencies on the master unit and slave unit are different.
- If the timer display mode on the master unit or slave unit is not CTL.

Displaying the time code during the synchronized operation

Press the CTL/TC button with the time code set to REPRO. The playback time code appears in the TAPE TIME display.
When you press the CTL/TC button again or the synchronized operation mode is released, the timer display mode returns to the CTL display mode.

7-1-3 Rewriting the Sync Offset Time

You can rewrite the sync offset time while the PCM-3348HR tape transport is stopped, or is in playback, fast forward or rewind mode. During recording, rehearsal, locate, return playback, or auto punch in/out operations, it is not possible to rewrite the sync offset time.

Procedure

Use the following procedure to rewrite the sync offset time.

1 Press the SF.mS/F.S button to set the LOCATE TIME display to the mSEC mode.

2 Press and light the RECALL button, then press the SYNC OFFSET button to display the sync offset time in the LOCATE TIME display.

3 Enter the change to the sync offset time using the numeric buttons.
For example, to reduce the value by 55 milliseconds, press the –, 5, 5, and = buttons in that order. To increase the value, press the + button in place of the – button.

4 Press and light the STORE button, then press the SYNC OFFSET button.

This saves the amended sync offset time.
The PCM-3348HR unit connected to the slave RM-3348HR unit on which you changed the sync offset time operates in synchronization with the new sync offset time.

Adjusting the value with the TRIM +/– buttons

Holding down the SYNC OFFSET button, press the TRIM +/– buttons to adjust the value.
After adjustment, the new sync offset time is saved.

Adjusting the value using the numeric buttons

If you already know the new value of the sync offset time which is required, use the following procedure.

1 Using the numeric buttons, display the required sync offset time in the LOCATE TIME display.

2 Press and light the STORE button, then press the SYNC OFFSET button.

This saves the value entered in step **1** as the sync offset time.

Preserving the sync offset time value

Once you press the SLAVE button turning it off, the synchronized operation mode is exited, and the sync offset time is preserved, but will be deleted next time you press the SLAVE button, turning it on.
To preserve the sync offset time for use in a subsequent synchronization operation, before switching to the synchronized operation mode, recall the stored sync offset time, and make a note of it.

Synchronized operation

- If you use variable speed playback or vari-sync playback on the master RM-3348HR unit, the slave units will follow the varying synchronization.
- There is a delay of approximately 2 seconds until the slave unit catches up with the master unit, to establish the servo lock. If you are carrying out auto punch in/out operation, this extra time is automatically added to the preroll time.
- Times shown on the slave unit are the times shown on the master PCM-3348HR unit, after correction by the sync offset time.
  For example, if the sync offset time is "00H00MIN10SEC000mSEC", and the punch in point is "00H02MIN50SEC", when you press the AUTO PUNCH button the respective times shown in the LOCATE TIME display are as follows.
  Master unit: 00 H02MIN50SEC
  Slave unit: 00 H03MIN00SEC

7-2 Time Code Chase

7-2-1 Overview

Time code chasing is a synchronization function whereby as the tape runs on the PCM-3348HR, a fixed sync offset is maintained between the playback time code and the external time code.

There are two modes for time code chase, as follows.

- **Address mode**
  After the initial synchronization with the external time code is achieved, if the discrepancy between the external time code and the playback time code exceeds a predetermined amount, the signals are re-synchronized, so that the synchronization with the external time code is maintained throughout the operation.

- **Free mode**
  After the initial synchronization with the external time code is achieved, the time code chase function terminates. Thereafter the unit returns to normal playback.

These two modes provide different functions as shown in the following table.

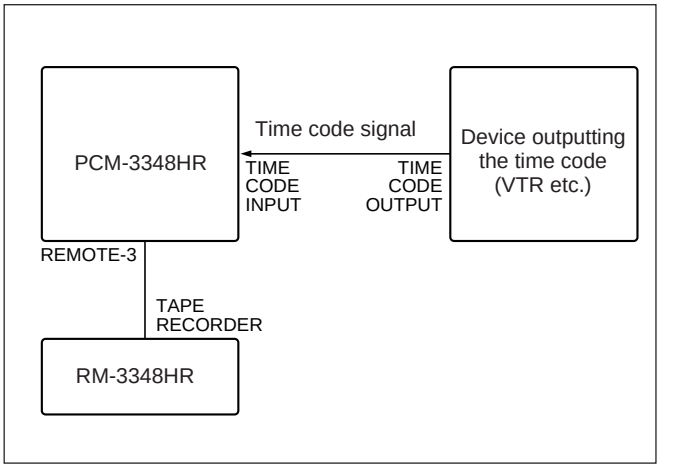
Difference between address mode and free mode

Function	Address mode	Free mode
Lock window, display window and re-sync window settings[a)]	Yes	No
Re-synchronization	Yes	No
Slow re-sync operation[a)]	Yes	No
Variation of the time offset during time code chase operation	Yes	Yes
Variation of the time offset after time code synchronization	Yes	No
Chasing a time code signal not synchronized to a video signal	Yes	No
Synchronization to an external time code signal with the SYNC CLOCK switch set to EXT and synchronizing to the word sync signal	No	Yes[b)]

a) For details see “7-2-5 Time Code Chase Operation Windows” (page 7-8) .
b) After synchronizing to the external time code, the slave unit is kept in synchronization by the word sync signal supplied from the master unit.

7-2-2 Time Code Signal Connections

Input the time code signal to the TIME CODE INPUT connector on the PCM-3348HR rear panel.



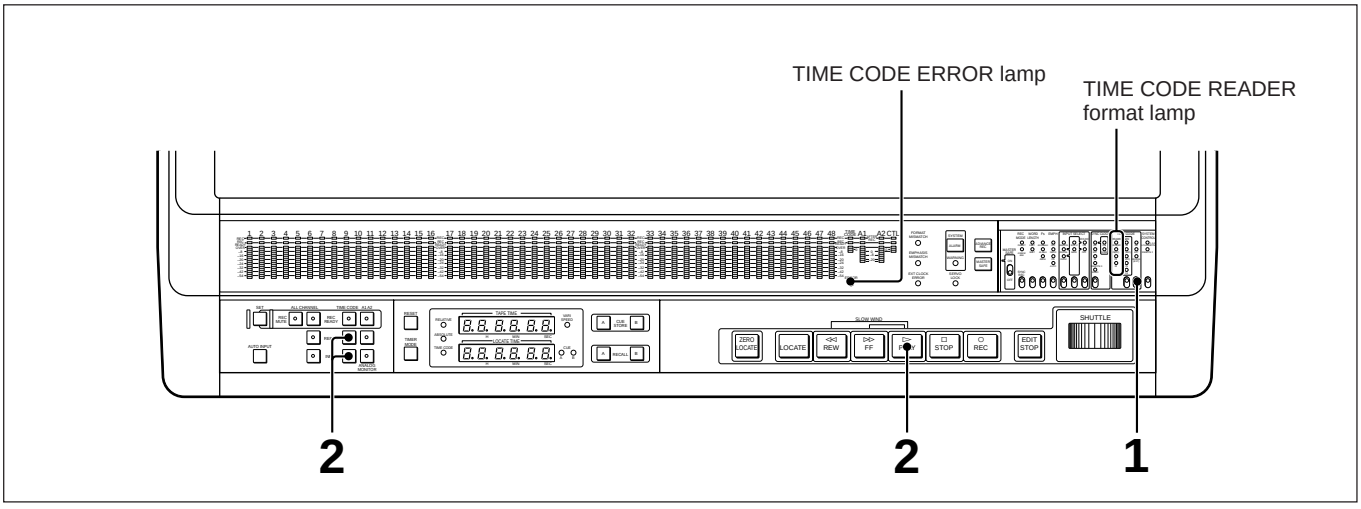
Time code signal connections

7-2-3 Selecting the Time Code Format

While the PCM-3348HR is carrying out time code chase operations, it plays back the time code on the tape and synchronizes it with the external time code. Therefore, the TIME CODE GEN format selection switch should be set to the same position as the external time code format and playback time code format.

Procedure

Use the following procedure to check that the slave unit and master unit have the same time code format.



Checking the time code formats of the slave and master units

1 Set the TIME CODE selection switch on the slave PCM-3348HR to EXT or REGENE (EXT).

2 Carry out playback on the master and slave units, and press the time code channel INPUT and REPRO buttons on the slave unit alternately to check whether the same TIME CODE READER format lamp lights for the external time code and the playback time code.

When you press the time code channel INPUT button, the TIME CODE READER format lamp shows the format of the external time code, and when you press the time code channel REPRO button, it shows the format of the playback time code.

If the formats are different for external and playback time codes

Use a tape whose playback time code format is the same as the external time code.

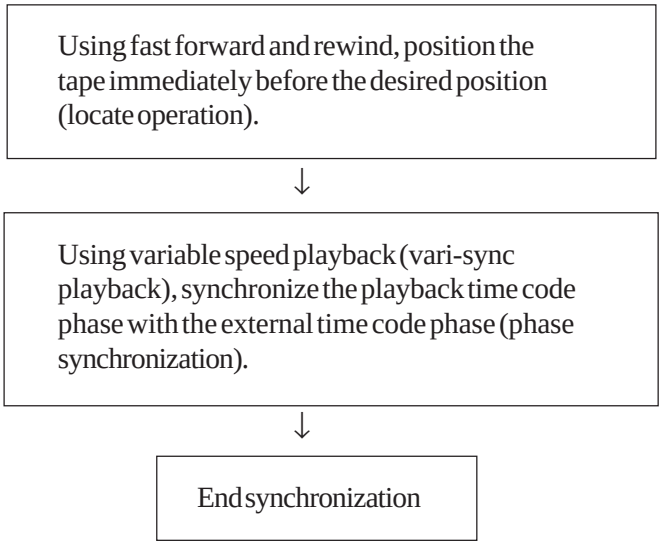
If the TIME CODE ERROR lamp lights

If the TIME CODE ERROR lamp lights when the format is the same for the playback and external time codes, set the TIME CODE GEN format selection switch to the same format as that of the playback time code.
This causes the TIME CODE ERROR lamp to go off.

7-2-4 Chase Modes

Time code chase operation sequence common to the two chase modes

The following flowchart illustrates the time code chase operation sequence.


Using fast forward and rewind, position the tape immediately before the desired position (locate operation).
↓
Using variable speed playback (vari-sync playback), synchronize the playback time code phase with the external time code phase (phase synchronization).
↓
End synchronization

In both address mode and free mode, the synchronization with the external time code is accurate to ±1/100 frame (±1 subframe), but once the synchronization is achieved, operation in the two modes is different.

Address mode

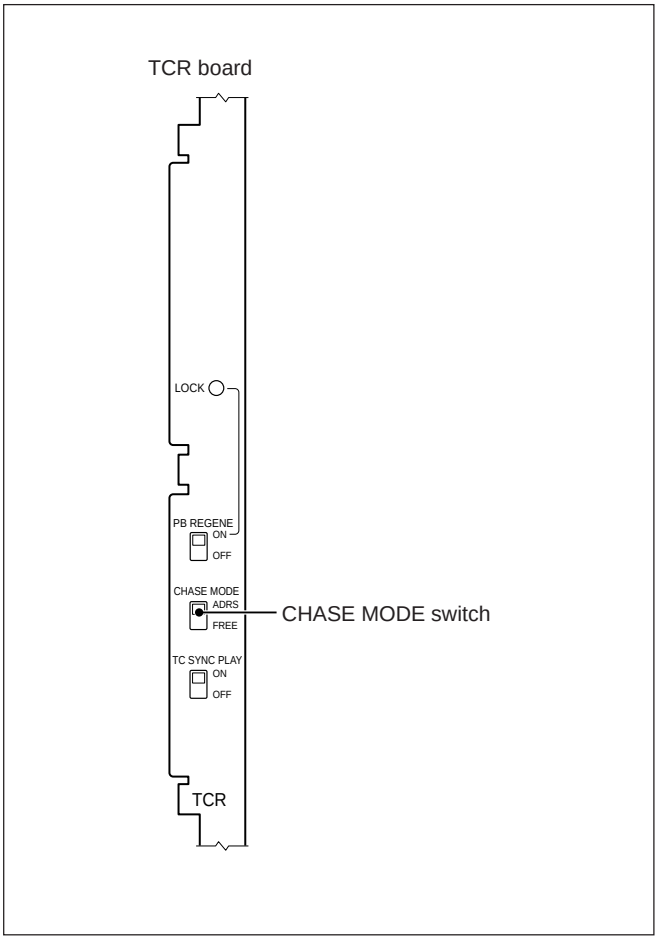
In this mode, once the synchronization with the external time code is achieved, until the STOP button or TC CHASE button is pressed, the unit maintains phase synchronization with the external time code.
Even if the external time code playback speed is varied, provided the variation is within ±12.5% of the standard playback speed, the synchronization is maintained.
This mode is appropriate when the external time code is supplied continuously and with no defects or errors.
In this mode there are three operation windows used to specify the error range for which re-synchronization is carried out, the variation range for vari-sync playback, and so forth.

For details see "7-2-5 Time Code Chase Operation Windows" (page 7-8) .

Free mode

In this mode, after the initial synchronization with the external time code is achieved, the time code chase function terminates. Thereafter the unit returns to normal playback.
This mode is appropriate when the external time code contains discontinuities or errors.
For example, if synchronizing the slave and master units to an external composite video signal, by carrying out the time code chase operation in the free mode, once the slave unit and master unit time codes are synchronized, even if the master unit time code contains discontinuities, the synchronization is maintained by the composite video signal.
In free mode, if the PCM-3348HR SYNC CLOCK switch is set to EXT or DI, during time code chase operations the SYNC CLOCK switch automatically switches to INT, and after synchronization with the external time code, switches back to EXT or DI. Thereafter, the slave unit synchronization is maintained by the external word sync signal or AES/EBU digital audio signal.

Selecting the chase mode

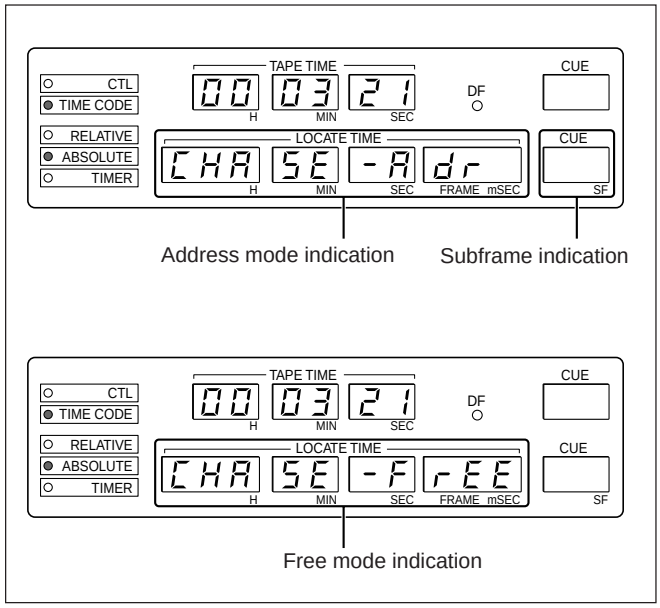


Selecting the chase mode

Select the chase mode with the CHASE MODE switch on the board.
ADRS: address mode
FREE: free mode

If you set the SYNC CLOCK switch on the PCM-3348HR to a position other than INT or VIDEO while in address mode, the time code chase function does not operate correctly.

The chase mode is shown in the LOCATE TIME display.



Chase mode indications

Checking the chase mode setting

Press the RECALL, = and 4 buttons in that order.
One of the following indications appears at the left end of the LOCATE TIME display.
A: address mode
F: free mode

7-2-5 Time Code Chase Operation Windows

In address mode, time code chase operations use three operation windows to specify the error range for which re-synchronization is carried out, the variation range for vari-sync playback, and so forth.
You can set each of these windows at any point during the operation. The memory backup function does not operate for the settings of these windows.
Note that although you can set these windows in free mode, the window settings have no effect in that mode.

- **Lock window**
  If the discrepancy between the playback time code and the external time code exceeds this window setting, re-synchronization begins.
  Setting range: 1 to 99, 100, 200, 300, 400 or 500 subframes
  Default setting: 1 subframe
  (1 subframe = $^{1}/_{100}$ frame)

- **Display window**
  If the discrepancy between the playback time code and the external time code exceeds this window setting, the PLAY button flashes while re-synchronization is being carried out to alert the user.
  Setting range: 1 to 99, 100, 200, 300, 400 or 500 subframes
  Default setting: 2 subframes
  If you attempt to set the display window to a value smaller than the value set for the lock window, the indication "ILLG" appears in the LOCATE TIME display.

- **Re-sync window**
  This window setting determines the range of variation in the playback speed for vari-sync playback, during re-synchronization.
  When the window setting is narrow: Re-synchronization varies the playback speed only slightly in vari-sync playback. This entails a longer time to achieve synchronization, but the variations in pitch are less apparent. This technique is referred to as slow re-sync. This setting is appropriate when using an analog tape recorder as the master unit.
  When the window setting is wide: Re-synchronization uses wide variations in the playback speed for vari-sync playback. This reduces the time required to achieve synchronization, but makes variations in pitch apparent. This setting is appropriate for following variable speed playback on a digital tape recorder.
  Setting range: 0.2% to 12.5% (0.1% units)
  Default setting: 12.5%

Setting the lock window and display window

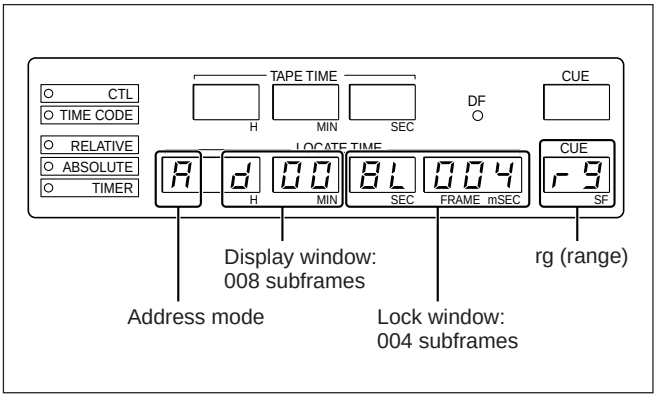
Use the following procedure to set the lock window and display window.

1 Use the numeric buttons to enter two three-digit numbers for the display window and lock window in that order.

These values appear in the LOCATE TIME display.
For example, to set the display window to 8 subframes and the lock window to 4 subframes, enter 0, 0, 8, 0, 0, 4.

2 Press the STORE, = and 4 buttons in that order.

This saves the values entered in step **1** as the corresponding window settings. They appear in the LOCATE TIME display.



Checking the settings of the display window and lock window

Press the RECALL, = and 4 buttons in that order.
You can check the settings of the display window and lock window at any point during operation.

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Setting the re-sync window

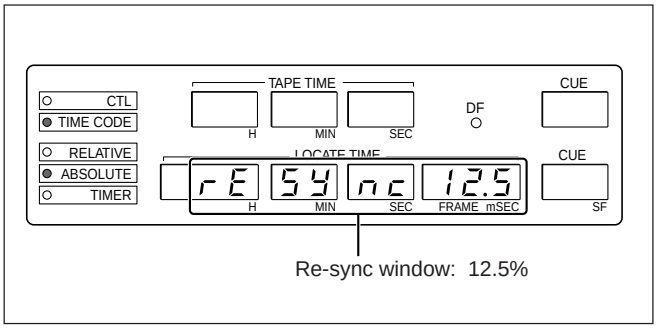
Use the following procedure to set the re-sync window.

1 Use the numeric buttons to enter a number which is 10 times the required setting.

This value appears in the LOCATE TIME display. For example, to set the window value to 12.5%, press the 1, 2 and 5 numeric buttons in that order.

2 Press the STORE, = and 5 buttons in that order.

This saves the value entered in step **1** as the re-sync window setting. It appears in the LOCATE TIME display.



Checking the setting of the re-sync window

Press the RECALL, = and 5 buttons in that order.
You can check the setting of the re-sync window at any point during operations.

7-2-6 Setting the Sync Offset

Before carrying out time code chase operations, it is necessary to set the time offset (sync offset) between external time code and PCM-3348HR playback time code values.
During time code chase operation, the tape transport operates while maintaining this constant offset between the playback time code and the external time code.

Setting the sync offset

Use the following procedure to set the sync offset.

1 Set the timer display mode to time code absolute display mode.

For details on the timer display modes see "2-5-2 Setting the Timer Display Mode" (page 2-15) .

2 Use either of the following methods to display a numeric value on the LOCATE TIME display.
- Using the numeric buttons, enter the required sync time offset.
- Press the RECALL, = and SYNC OFFSET buttons in that order, to recall the current setting.

3 Press the STORE and SYNC OFFSET buttons in that order.

This saves the value entered in step **2** as the sync offset.

Correcting the sync offset

Holding down the SYNC OFFSET button, press the TRIM +/– buttons to adjust the value.
This method automatically saves the altered value.
After the slave unit is synchronized with the external time code, by setting the time code display units to subframes, you can very effectively make a correction to the sync offset while listening to the playback sound from the slave unit.

Recalling the sync offset

Press the RECALL and SYNC OFFSET buttons in that order.

The sync offset time appears in the LOCATE TIME display in frame units.

When the sync offset is changed during time code chase operation

If the difference between the new value and the old value is not more than 2 frames, the re-synchronization is achieved without interrupting playback.
If the difference between the new value and the old value exceeds 2 frames, playback is first interrupted, then the re-synchronization is carried out.

Relationship between sync offset and time code values

The relationship between the time code values depends on the sign of the sync offset, as follows.

- **When positive**
  The slave time code value is ahead of the maser time code value.
- **When negative**
  The slave time code value is behind the master time code value.
- **When the offset is zero**
  The slave time code value is the same as the master time code value.

7-2-7 Time Code Chase Operation

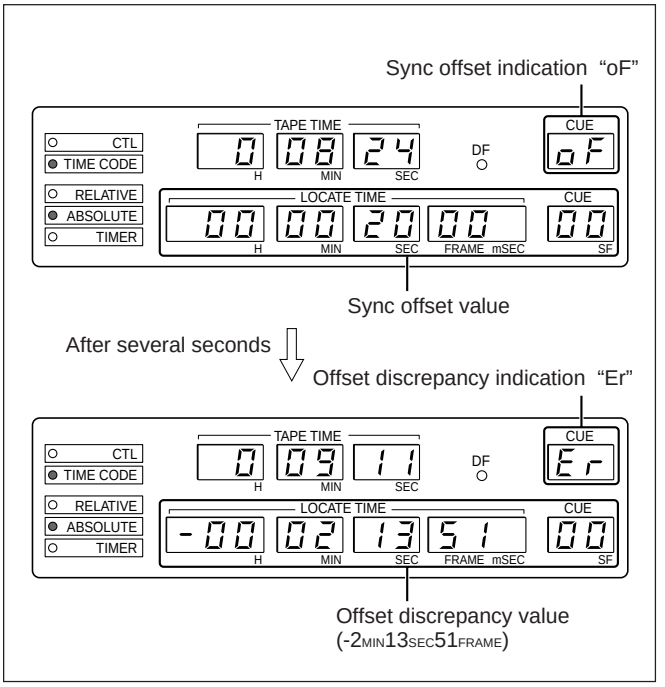
Before carrying out a time code chase operation, first make the settings described in the sections from "Selecting the chase mode" (page 7-7) to "Setting the Sync Offset" (page 7-9) .
Then, use the following procedure to carry out a time code chase operation.

1 Start playback on the master unit, or input the external time code.

2 Ensure that the tape transport on the slave PCM-3348HR is stationary, then press and light the TC CHASE button.

This starts time code chase operation, and the display units of the LOCATE TIME display switch to subframes.
The display appears as follows.

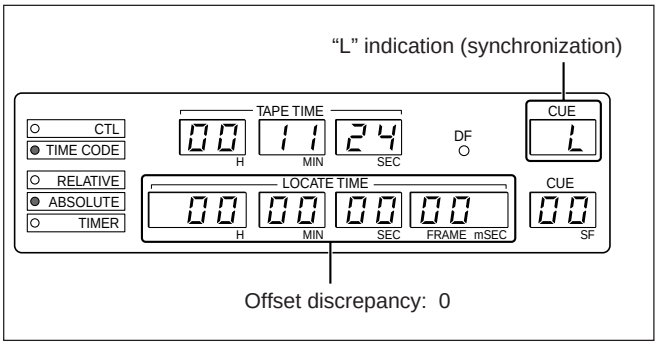
- **For the first few seconds after starting chase operation**
  LOCATE TIME display: sync offset
  Upper CUE display: "oF"
- **Thereafter**
  LOCATE TIME display: offset discrepancy [1)]
  Upper CUE display: "Er"



1) Offset discrepancy = Playback time code – External time code – Sync offset

Using address mode

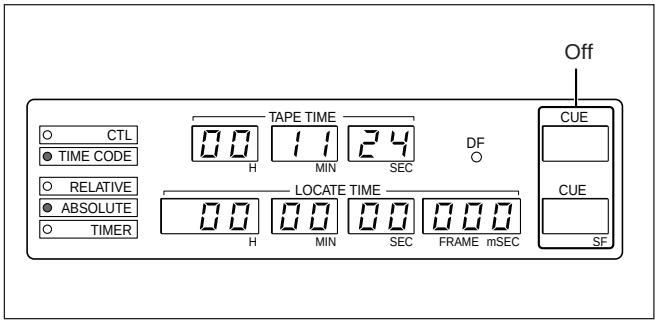
After synchronizing with the external time code, the upper CUE display shows "L" (lock) to indicate the synchronization.
If the offset error discrepancy exceeds the setting of the lock window, the "L" indication changes to "Er," and re-synchronization begins.
Once synchronization is achieved, this returns to "L."
The re-synchronization process continues until you either stop the tape transport or press the TC CHASE button.



Address mode indication

Using free mode

Once the synchronization with the external time code is achieved, both upper and lower CUE displays go off, and the system returns to normal playback.



Free mode indication

Note on time code chase operation

- During time code chase operation, not all buttons on the slave unit can be used. The details are as follows.
  Buttons which can be used: PLAY, REC, REH and STOP
  Buttons which cannot be used: FF, REW, RTN, RLB, AUTO PUNCH and LOC
  During a locate operation or vari-sync playback, only the STOP button can be used.
- During operation in address mode, since the vari-sync function is used to carry out re-synchronization, the variable speed playback function of the RM-3348HR is not available.

Carrying out a chase recording (or rehearsal)

Use the following procedure to carry out a chase recording.

1 Check that the unit is synchronized or being re-synchronized to the external time code.

2 Holding down the REC (or REH) button, press the PLAY button.

This carries out a chase recording (or rehearsal).

During chase recording (or rehearsal), changing the sync offset by more than 2 frames, or pressing the FF, REW or STOP button on the master unit cancels the chase recording (or rehearsal), and the locate operation begins. After synchronization to the external time code, chase playback begins.

Ending a chase recording (or rehearsal) without abandoning the chase operation

Press the PLAY button.
This switches to the chase playback mode.

Temporarily halting the chase operation

Stop the tape transport on the master unit, or stop the input of the external time code.
When the tape transport on the master unit stops, the tape transport on the slave unit also stops. The LOCATE TIME display shows the indication "no in tc."

Ending the chase operation

Press the STOP button or TC CHASE button on the slave unit.
The tape transport stops, the TC CHASE button goes off, and the STOP button lights. The units indicated in LOCATE TIME display switch to frames.

Error indication during chase operations

Error indications in the LOCATE TIME display

Indication	Problem	Action to be taken
no in tc	The external time code is not input.	Input the external time code.
no Pb tc	There is no time code on the tape on the slave unit.[a)]	Prestripe the tape being used, or use another tape which has already been prestriped.

a) Even if a prestriped tape is used, "no Pb tc" may momentarily appear accompanying the variation of tape transport during chase operation. This is not a problem.

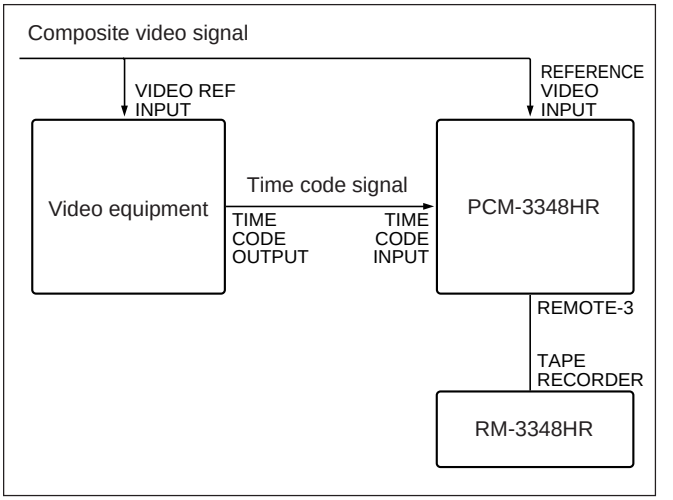
7-2-8 Synchronized Operation with Video Equipment Using the Time Code Chase Function

This technique uses a composite video signal input to the video equipment and PCM-3348HR as a reference signal. The video equipment supplies the PCM-3348HR with a time code signal. Using the time code chase function in this case means that the PCM-3348HR tape first synchronizes to the time code, and then runs in synchronization with the composite video signal. You can select either chase mode, address mode or free mode, depending on the application.

- **Using address mode**
  After first synchronizing to the external time code, the composite video signal is then used for synchronization, but if there is a discrepancy between the external time code and the playback time code, the unit re-synchronizes. When the discrepancy is removed, the unit returns to synchronization by the composite video signal.

- **Using free mode**
  After first synchronizing to the external time code, the time code chase operation terminates. Thereafter the tape runs on the PCM-3348HR in synchronization with the composite video signal.

Connections



Connections for synchronized operation with video equipment

PCM-3348HR switch settings

Switch	Setting
REC MODE	INSERT
SYNC CLOCK	VIDEO
75 Ω (for REFERENCE VIDEO INPUT connector)	When terminated: ON When not terminated: OFF
Timer display mode	TIME CODE
TIME CODE selection switch	EXT

Carrying out recording

Press and light the REC READY button for the channel or channels to be recorded.
After first synchronizing with the external time code, hold down the REC button, and press the PLAY button. The channel or channels for which the REC READY button is lit will start recording.

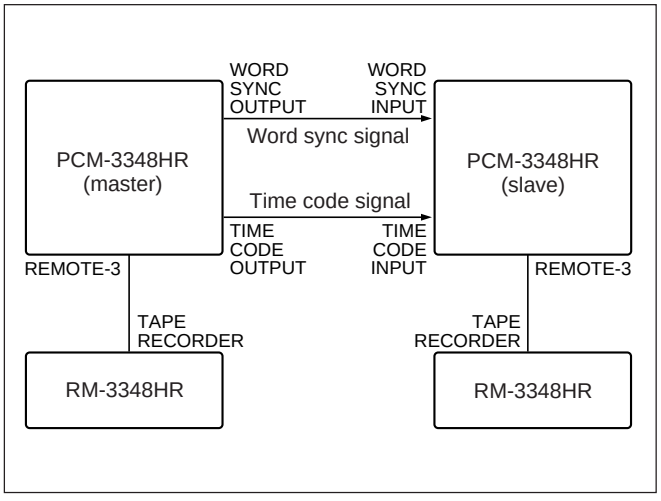
Notes on operation

- The video equipment time code and PCM-3348HR time code formats must be the same.
- When configuring a system using digital I/O, if you use the vari- sync function, the PCM-3348HR word sync signal frequency will vary and the word synchronization for other connected equipment will also be lost.

7-2-9 Synchronized Operation of Two PCM-3348HR Units Using the Time Code Chase Function

When using this method of synchronized operation, after the slave unit has locked onto the time code signal from the master unit, it synchronizes to the word sync signal input from the master unit. Therefore, the time code format and sampling frequency must be the same on the two units.
Select the free chase mode. The digital audio input and output signals should be AES/EBU or SDIF-2 format.
A DAE-D5000 Disk Mastering system or PCM-9000 Digital Master Disc Recorder can also be used as the master unit.

Connections



Connections for synchronized operation of two PCM-3348HR units

PCM-3348HR switch setting

Switch	Master unit	Slave unit
REC MODE	INSERT	INSERT
SYNC CLOCK	INT	EXT/DI
Fs	Set automatically on playback	Same as master unit
Timer display mode	—	TIME CODE
TIME CODE GEN format selection switch	TIME CODE format being used	
TC SYNC PLAY switch on the TCR board	OFF	—[a)]
TC GEN switch on the MC board	REC RUN	—

a) Even if this is set to ON, there is no time code sync playback.

Synchronization operation

Carrying out free mode time code chase operation starts synchronization of the slave unit, whereupon the SYNC CLOCK switch on the slave unit, which is set to EXT, automatically switches to INT.
After the slave unit has once synchronized to the master unit, it reverts to normal playback, and the SYNC CLOCK switch setting reverts to EXT.
Thereafter synchronization is maintained by the word sync signal.

Carrying out recording

Press the REC READY button for the channel or channel to be recorded, turning it on.
After first synchronizing with the external time code, hold down the REC button, and press the PLAY button. The channel or channels for which the REC READY button is lit will start recording.

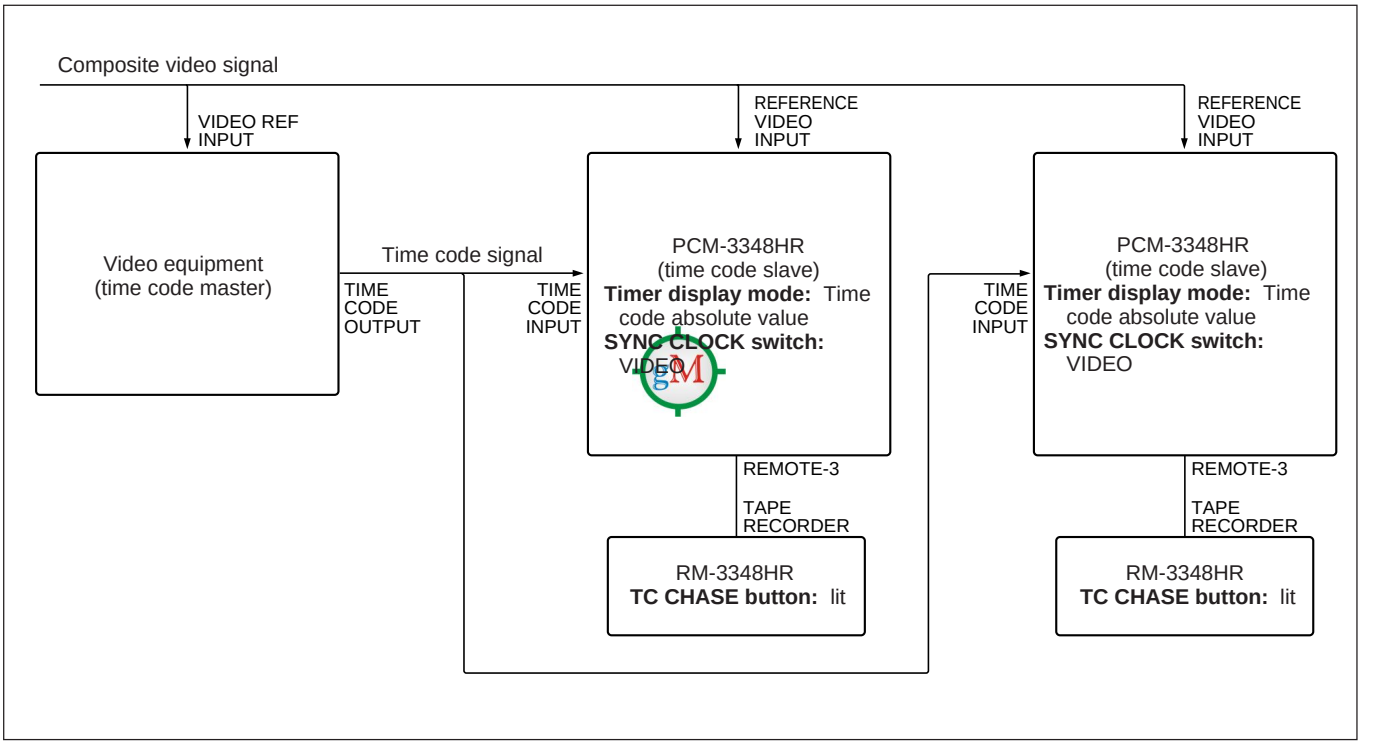
Notes on operation

- If the SYNC CLOCK switch is in the EXT position, and you attempt to carry out time code chasing in address mode, time code chase function is not possible.
- The time code formats of the master and slave units must be the same.

7-2-10 Expansion to 96 Channels Using Synchronized Operation with Video Equipment

Using two PCM-3348HR units in time code chase operation, and synchronizing to video equipment allows you to expand the video synchronized system from 48 channels to 96 channels.
You can select either address mode or free mode as the chase mode.

Connections



Connections for synchronized operation of two PCM-3348HR units with video equipment

7-2-11 Time Code Chase and Time Code Sync Playback

Since time code chasing uses an external time code for synchronization, and time code sync playback uses a composite video signal for synchronization, it is not possible to use both functions at the same time.
For details on time code sync playback refer to "3-7-8 Time Code Sync Playback" (page 3-25) .

The synchronization accuracy of these two operations is as follows.

Time code chasing
±1/100 frame (± 1 subframe)

Time code sync playback
VARI SYNC switch on the MC board set to ON:
0Hsync to –2Hsync
VARI SYNC switch on the MC board set to OFF:
±1 sector (1 millisecond when Fs = 48.0 kHz)

7-2-12 SYNC CLOCK Switch Setting During Time Code Chase Operation and Variable Speed Control

SYNC CLOCK switch setting

In address mode
When the SYNC CLOCK switch on the PCM-3348HR system control block is set to EXT, the vari-sync function does not operate, and therefore the time code chase function cannot be used. To use the time code chase function in address mode, set the SYNC CLOCK switch to INT or VIDEO.

In free mode
When the SYNC CLOCK switch is set to EXT or DI and time code chase operation starts, during synchronization it automatically switches to INT. After synchronization with the external time code signal it returns to EXT or DI.

Variable speed control function

In address mode
During time code chase operation, re-synchronization is carried out each time there is a synchronization discrepancy, and therefore until the time code chase operation is ended it is not possible to use the variable speed control function on the RM-3348HR connected to the slave unit.

In free mode
If the SYNC CLOCK switch is set to INT or VIDEO, after synchronization to the external time code, you can use the variable speed control function on the RM-3348HR connected to the slave unit.

8-1 Backup Copy Function

Using two PCM-3348HR units, you can copy the 48 channels of digital audio signals on a tape by connecting the SDIF-2 (BALANCE) or MADI connectors.
This process avoids any D/A or A/D conversion, and provides a perfect copy tape.

Note

Using the SDIF-2 (BALANCE) connectors requires the SDIF-2 (balanced) format special-purpose cable. For connection via the MADI connectors, use a BNC cable.

There are two ways of making a backup copy:

- **Copying the digital audio signals only**
  This means that the CTL values (sector addresses) on the copy tape will be different from those on the original tape.

- **Copying the CTL and digital audio signals**
  This provides a completely identical tape.

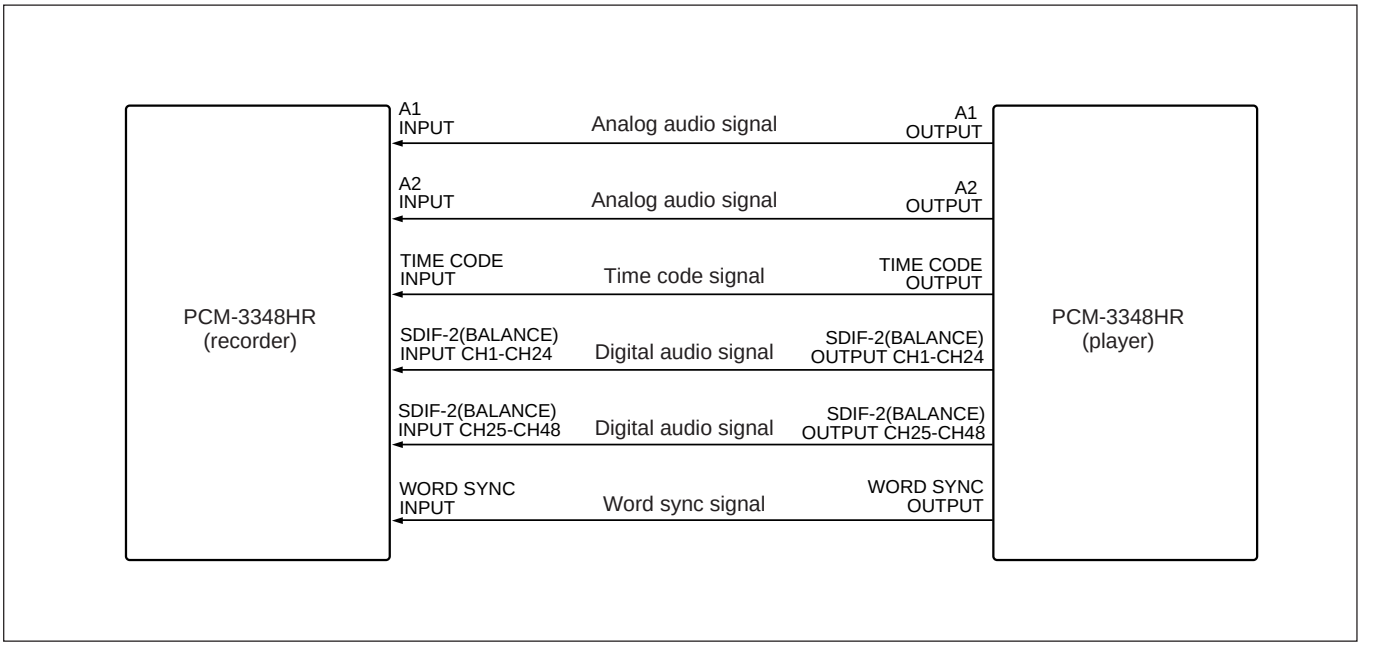
8-2 Copying the Digital Audio Signals Only

Using only the PCM-3348HR units, you can make a backup copy.

8-2-1 Copying via the SDIF-2 (BALANCE) Connectors

Connections

Turn off the power to all units before making the connections.



Connections for copying the digital audio signals only

Procedure

Use the following procedure to copy the digital audio signals.

1 Mount the original tape on the player unit and set the MASTER SAFE switch on the PCM-3348HR system control block to the ON position.

2 Mount a blank tape on the recorder unit and set the switches and buttons as follows:
- MASTER SAFE switch: OFF
- REC MODE switch: ADVANCE
- TIMER MODE button: CTL ABSOLUTE
- Fs switch: Sampling frequency of the original tape
- WORD LENGTH switch: Word length of the original tape
- INPUT SELECT switch: DIGITAL
- SDIF-2/MADI switch: SDIF-2
- SYNC CLOCK switch: EXT
- TIME CODE selection switch: EXT or REGEN (EXT)
- ALL CHANNEL REC READY button: ON
- A1 A2 REC READY button: ON
- TIME CODE REC READY button: ON

Check that the 2 CH DIO SET UP button on the RM-3348HR is off when the RM-3348HR is connected to the recorder.

3 On the recorder, set CTL to the starting point address on the original tape.

4 Begin playback on the player.

5 On the recorder, holding down the REC button, press the PLAY button.

This begins the copying process.

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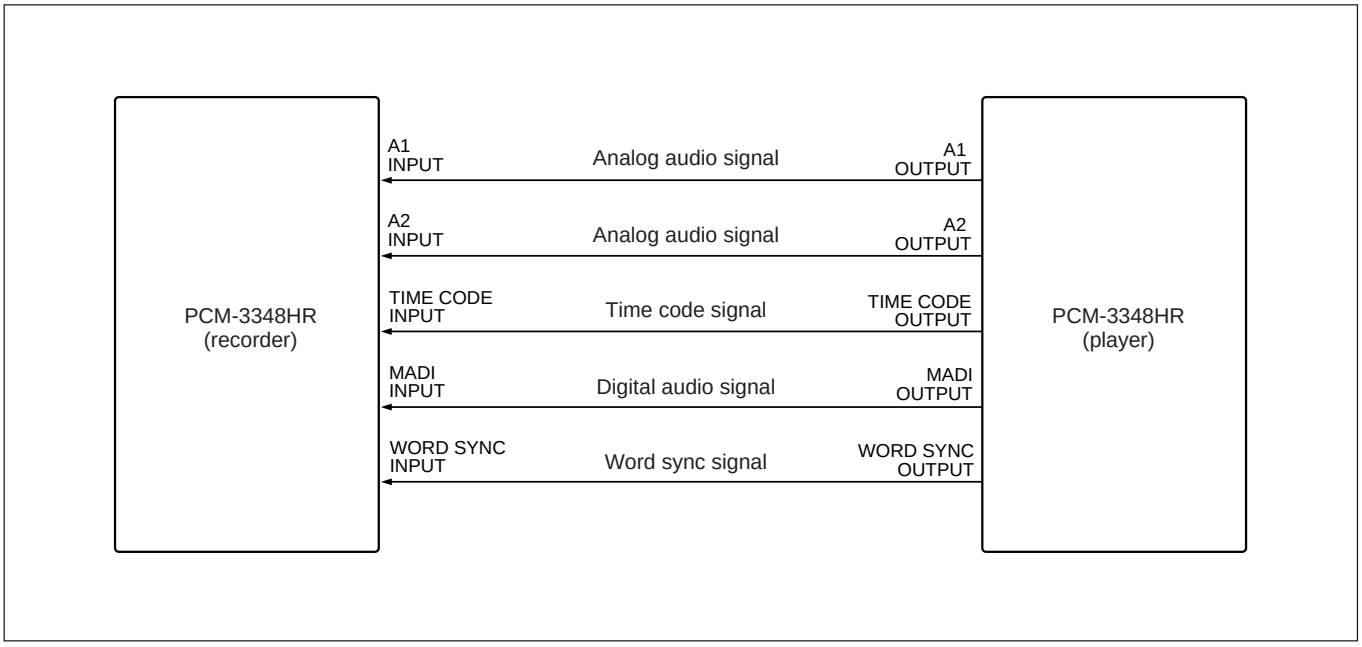
8-2-2 Copying via the MADI Connectors

Connections

Power off all units before making the connections.



Connections for copying the digital audio signals only

Procedure

Use the following procedure to copy the digital audio signals.

1 Mount the original tape on the player unit, and set the MASTER SAFE switch on the PCM-3348HR system control block to the ON position.

2 Mount a blank tape on the recorder unit, and set the switches and buttons as follows:
- MASTER SAFE switch: OFF
- REC MODE switch: ADVANCE
- TIMER MODE button: CTL ABSOLUTE
- Fs switch: sampling frequency of the original tape
- WORD LENGTH switch: word length of the original tape
- INPUT SELECT switch: DIGITAL
- SDIF-2/MADI switch: MADI
- SYNC CLOCK switch: EXT
- TIME CODE selection switch: EXT or REGEN (EXT)
- ALL CHANNEL REC READY button: ON
- A1 A2 REC READY button: ON
- TIME CODE REC READY button: ON

Check that the 2 CH DIO SET UP button on the RM-3348HR is off when the RM-3348HR is connected to the recorder.

3 On the recorder, set the CTL to the start point address on the original tape.

4 Begin playback on the player.

5 On the recorder, holding down the REC button, press the PLAY button.

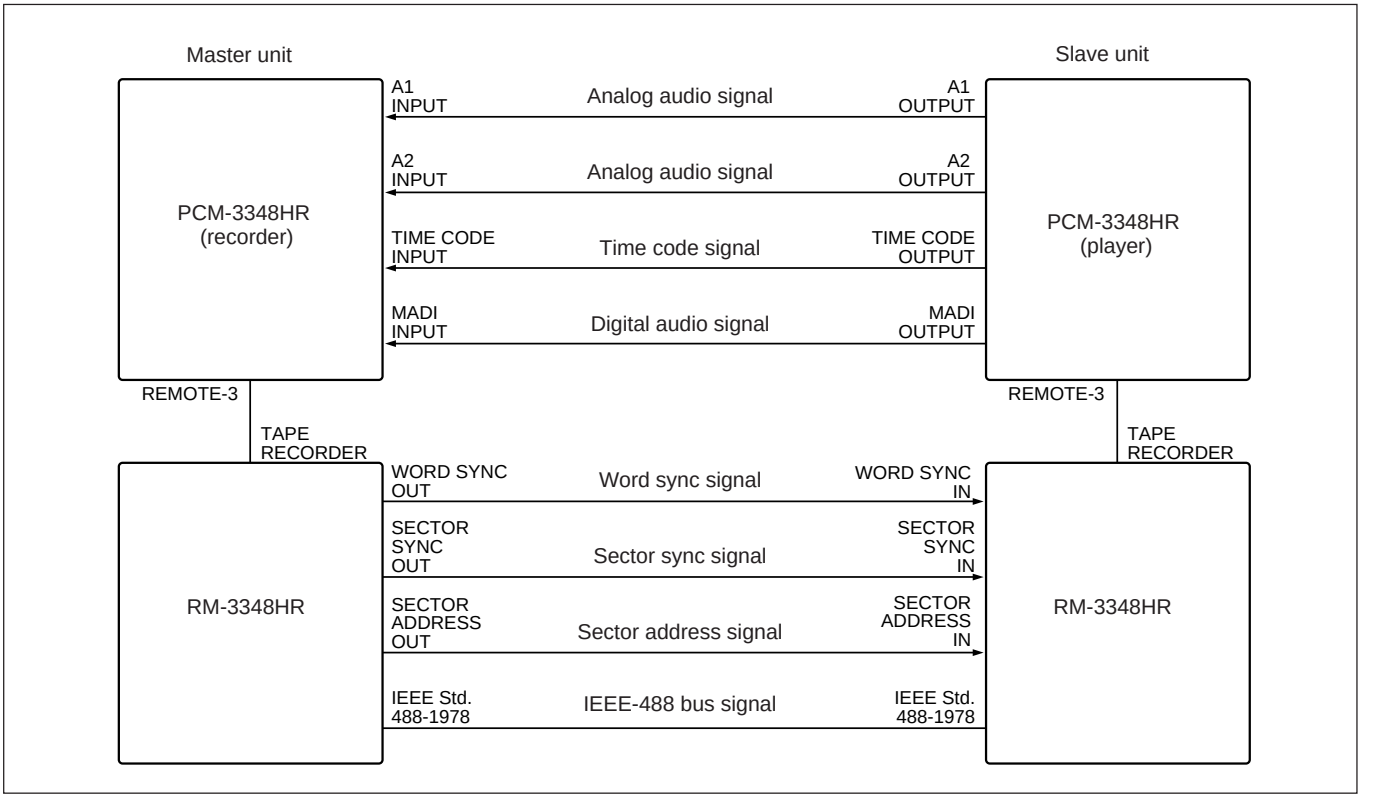
This begins the copy process.

8-3 Copying the CTL and Digital Audio Signals

8-3-1 Connecting Only the Audio Signal and Time Code Signal through the PCM-3348HR Units

Connections

Turn off the power to all units before making the connections.



Connections for copying the CTL and digital audio signals (1)

Procedure

Use the following procedure to copy the CTL and digital audio signals.

1 Mount the original tape on the player unit and set the MASTER SAFE switch on the PCM-3348HR system control block to the ON position.

2 Mount a blank tape on the recorder unit and set the switches and buttons as follows:
- MASTER SAFE switch: OFF
- Fs switch: Sampling frequency of the original tape
- WORD LENGTH switch: Word length of the original tape
- TIMER MODE button: CTL ABSOLUTE
- REC MODE switch: ADVANCE
- INPUT SELECT switch: DIGITAL
- SDIF-2/MADI switch: MADI
- TIME CODE selection switch: EXT or REGEN (EXT)

3 On the recorder, set CTL to the starting point address on the original tape, and record the CTL for about 30 seconds in advance mode.

4 Set the REC MODE switch on the recorder to ASSEMBLE.

5 Locate both recorder and player tapes at the CTL address start point.

6 On the RM-3348HR connected to the player, press the SLAVE, CLEAR, STORE, SYNC OFFSET buttons in that order.

This sets the sync offset time on the player to $00_{H}00_{MIN}00_{SEC}$.

7 Set the buttons on the recorder as follows.
- ALL CHANNEL REC READY button: ON
- A1 A2 REC READY button: ON
- TIME CODE REC READY button: ON

8 On the recorder (master unit) press the PLAY button.

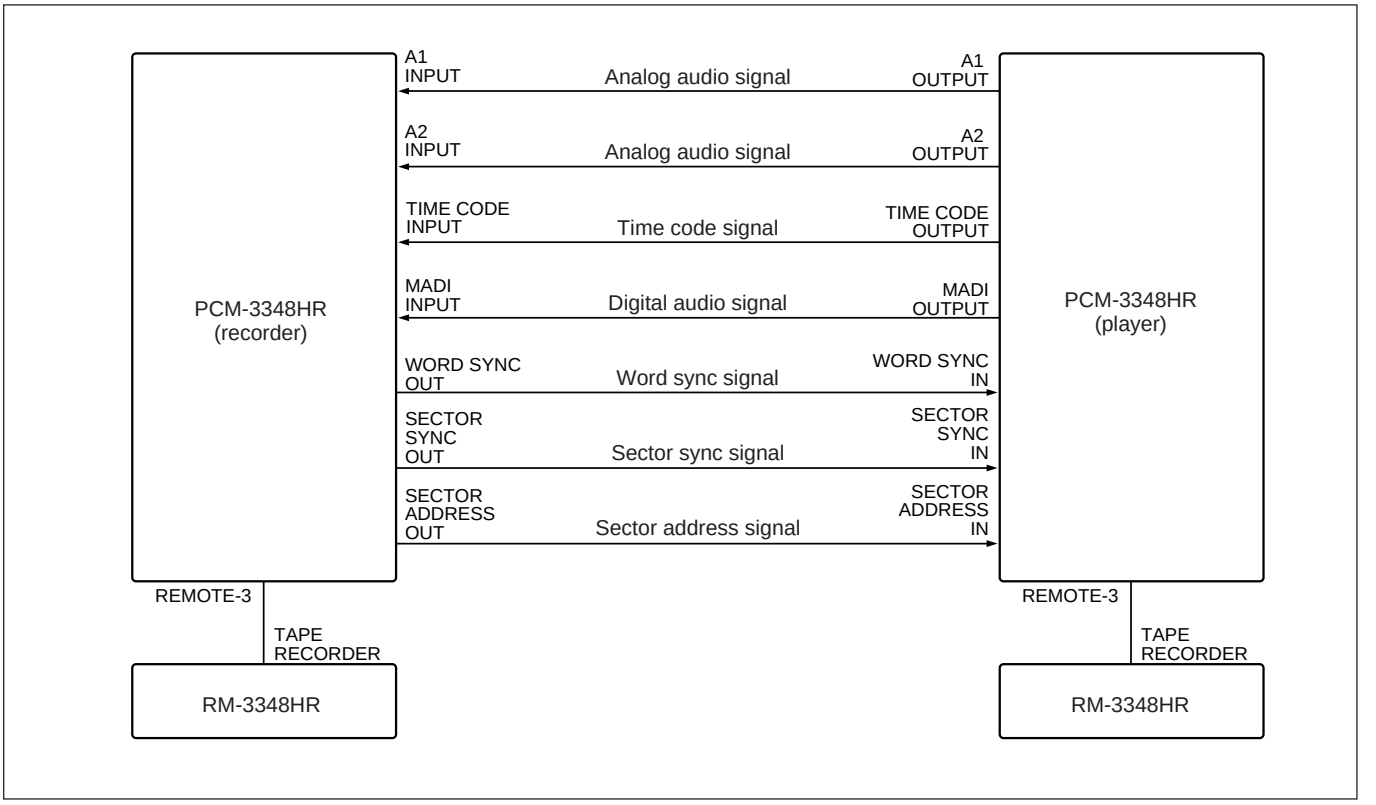
9 Check that the player (slave unit) has synchronized and on the recorder, holding down the REC button, press the PLAY button.

This begins the copying process.

8-3-2 Connecting All Signals through the PCM-3348HR Units

Connections

Turn off the power to all units before making the connections.



Connections for copying the CTL and digital audio signals (2)

Procedure

Use the following precedure to copy the CTL and digital audio signals.

1 Mount the original tape on the player unit, and set the MASTER SAFE switch on the PCM-3348HR system control block to the ON position.

2 Mount a blank tape on the recorder unit, and set the switches and buttons as follows:
- MASTER SAFE switch: OFF
- REC MODE switch: ADVANCE
- TIMER MODE button: CTL ABSOLUTE
- Fs switch: Sampling frequency of the original tape
- WORD LENGTH switch: Word length of the original tape
- INPUT SELECT switch: DIGITAL
- SDIF-2/MADI switch: MADI
- SYNC CLOCK switch: EXT
- TIME CODE selection switch: EXT or REGEN (EXT)
- ALL CHANNEL REC READY button: ON
- A1 A2 REC READY button: ON
- TIME CODE REC READY button: ON
- CTL COPY switch on the CTK board: ON

Check that the 2 CH DIO SET UP button on the RM-3348HR is off when the RM-3348HR is connected to the recorder.

3 Begin playback on the player.

4 On the recorder, holding down the REC button, press the PLAY button.

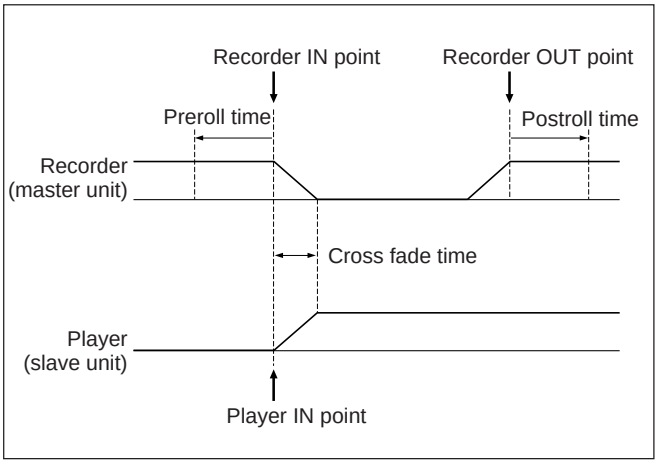
This begins the copying process.

9-1 Overview

This process entails editing using two or more PCM-3348HR units, making a sector-based synchronized transfer from the player (slave) unit to a recorder (master) unit.

Edit points

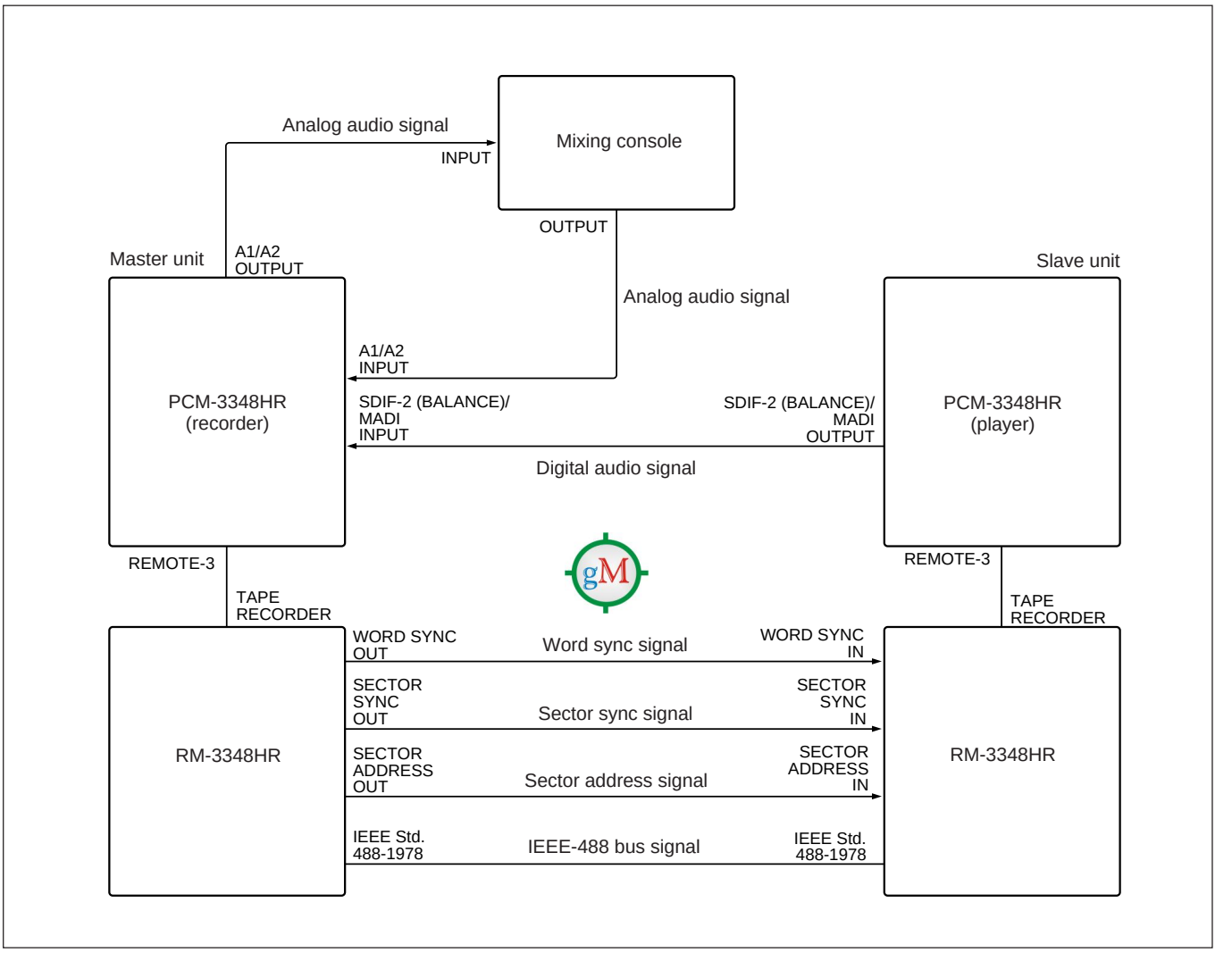
The edit points are as shown in the following diagram.



Edit points

9-2 Connections

Connect a monitor signal to one of the recorder analog audio channels for use as a cue signal during editing. The tape in the player should also have a cue signal already recorded on it.
Monitor the player sound through the recorder.



Connections for editing

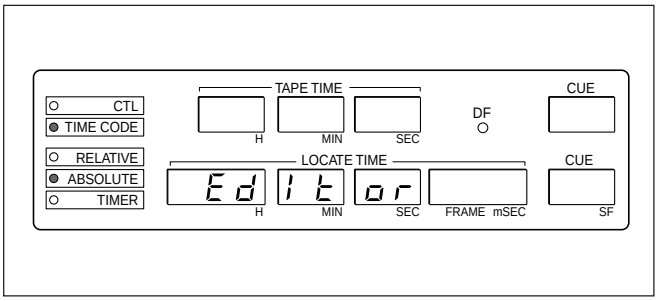
Note

For editing, the sampling frequency of all of the PCM-3348HR units must be the same. If they are not all the same, when you press the SLAVE button on the RM-3348HR, the LOCATE TIME display shows the indication "ILLG," and the editing operation is not possible.

9-3 Selecting the Editor Mode

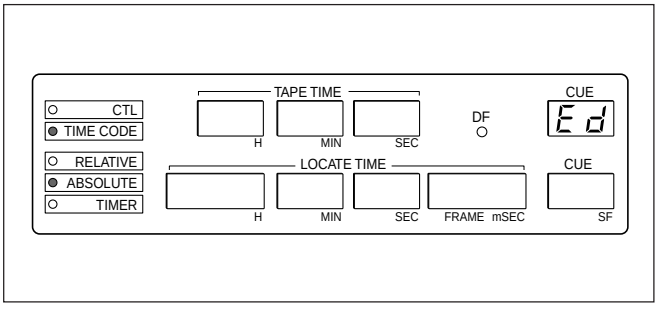
1 On the master and slave RM-3348HR units, press the 1, STORE, = and 0 buttons in that order.

The indication "Editor" appears in the LOCATE TIME display.



2 Press the ↑ button.

This selects the editor mode, and the indication "Ed" appears in the upper CUE display.
The SYNC CLOCK switch of the slave PCM-3348HR unit automatically switches to REMOTE 3.



While the editor mode is selected, the indication "Ed" remains in the upper CUE display. Only the lower CUE display is used for repeat playback indication.

Note

If you press and light the SLAVE button on the RM-3348HR connected to the player, before selecting the editor mode on the player, the editor mode will not operate correctly.

Abandoning the selection of editor mode

In step **2** above, instead of pressing the ↑ button, press the CLEAR button.

9-4 Setting Editing Points

9-4-1 Setting the Editing IN/OUT points

Setting the editing IN point on the recorder

Use the normal procedure to store the punch in point on the recorder.

For details on storing the punch in point, see "4-4 Auto Punch In/Out" (page 4-14).

Setting the editing IN point on the player

1 Press and extinguish the SLAVE button on the player RM-3348HR.

2 Use the normal procedure to store the punch in point on the player.

Setting the editing OUT point on the recorder

Use the normal procedure to store the punch out point on the recorder. If the recorder editing OUT point is not set, the editor mode will not operate correctly. Even for assemble editing, where the punch out point does not normally need to be set, set the editing OUT point at a point near the end of the tape.

For details on storing the punch out point, see "4-4 Auto Punch In/Out" (page 4-14).

Setting the editing OUT point on the player

Although it is possible to set the player editing OUT point, it is not required for editing operations.

Notes on finding the IN point using the search knob

When using the search knob and listening to the playback sound to locate the editing IN point, note the following points.

For details on location of the search knob, refer to "Tape transport" (page A-2).

Since the digital audio signal passes through a decoder, there is a delay of approximately 65 milliseconds (when the sampling frequency is 48.0 kHz) from the time that the signal is read by the playback head until the sound can be heard. On the other hand, the CTL address is ready to be displayed immediately it is read. To avoid a discrepancy between the playback sound heard and the displayed CTL value, the PCM-3348HR always subtracts 65 milliseconds from the CTL address before displaying it.

When you use the search knob for cuing, you hear the analog playback sound. At this point, the CTL address for the recorded sound is read.
The displayed CTL address value, however, has 65 milliseconds subtracted from it, to compensate for the digital processing delay.
Therefore, when using the search knob to locate an edit point, it is necessary first to correct the displayed CTL value before storing it.

Correction procedure

Use the following procedure to correct editing IN point.

1 Play back the tape, using the search knob, and cue up the editing IN point.

2 Press the ↓ button on the RM-3348HR.

This transfers the time value in the TAPE TIME display to the LOCATE TIME display.

3 Use the SF.mS/F.S button to set the LOCATE TIME display units to milliseconds.

4 **When the sampling frequency is 44.056 kHz or 44.1 kHz**
Press the +, 7, 1, =. STORE and IN buttons in that order.
When the sampling frequency is 48.0 kHz
Press the +, 6, 5, =, STORE and IN buttons in that order.

This sets the editing IN point to the corrected value.

9-4-2 Correcting the Editing Points

Correcting the recorder and player editing points simultaneously

Use the following procedure to correct the recorder and player editing points simultaneously.

1 Press and light the SLAVE button on the player RM-3348HR.

2 Use the SF.mS/F.S button on the recorder RM-3348HR to select 1 millisecond or 1 second as the correction unit.

3 Holding down the IN or OUT button on the recorder RM-3348HR, press the TRIM +/– buttons.

This corrects the editing IN or OUT point on the recorder and player simultaneously.

Correcting the recorder and player editing points individually

Use the following procedure to correct the recorder and player editing points individually.

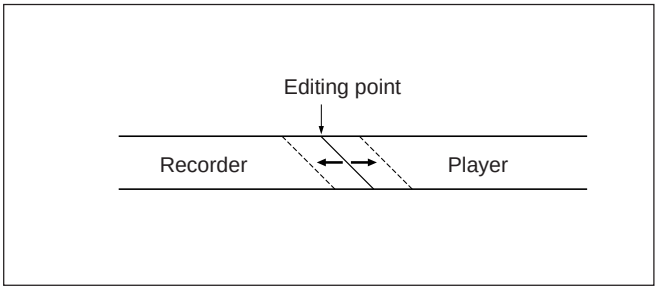
1 Press and extinguish the SLAVE button on the player RM-3348HR.

2 Use the SF.mS/F.S button on the recorder or player RM-3348HR to select 1 millisecond 1 second as the correction unit.

3 Holding down the IN or OUT button on the recorder or player RM-3348HR, press the TRIM +/– buttons.

This corrects the recorder or player editing IN or OUT point individually.

Moving the editing points forward or back



Moving the editing points forward or back

Moving the editing point forward

1 Press and light the SLAVE button on the player RM-3348HR.

2 Holding down the IN button on the recorder RM-3348HR, press the TRIM – button.

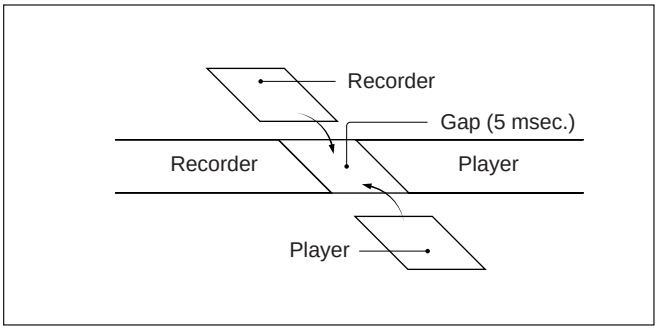
Moving the editing point back

1 Press and light the SLAVE button on the player RM-3348HR.

2 Holding down the IN button on the recorder RM-3348HR, press the TRIM + button.

Filling in a gap between editing points

This description takes as an example the case where there is a 5 millisecond gap.



Filling in a gap between editing points

Use the following procedure to fill in the gap between editing points.

Filling in with the recorder sound

1 Press and extinguish the SLAVE button on the player RM-3348HR.

2 Holding down the IN button on the recorder RM-3348HR, press the TRIM + button five times.

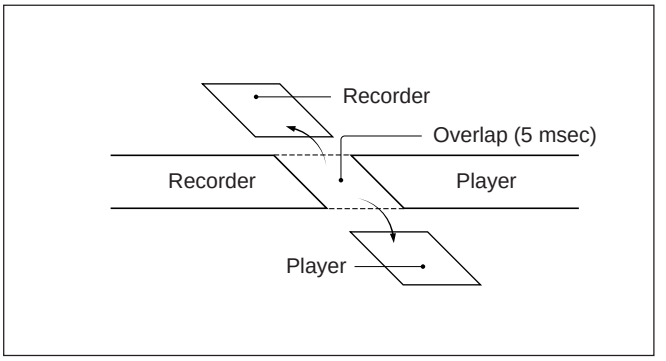
Filling in with the player sound

1 Press and extinguish the SLAVE button on the player RM-3348HR.

2 Holding down the IN button on the player RM-3348HR, press the TRIM – button five times.

Removing an overlap between editing points

This description takes as an example the case where there is a 5 millisecond overlap.



Removing an overlap between editing points

Use the following procedure to remove an overlap between editing points.

Cutting the recorder sound

1 Press and extinguish the SLAVE button on the player RM-3348HR.

2 Holding down the IN button on the recorder RM-3348HR, press the TRIM – button five times.

Cutting the player sound

1 Press and extinguish the SLAVE button on the player RM-3348HR.

2 Holding down the IN button on the player RM-3348HR, press the TRIM + button five times.

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9-5 Carrying Out Rehearsal and Editing

Use the following procedure to carry out rehearsal and editing.

1 Press and light the SLAVE button on the player RM-3348HR.

2 Put the digital audio channel on the recorder to be used for recording in the recording ready state.

3 **To carry out a rehearsal**
Press the recorder AUTO PUNCH button.

To carry out editing
Holding down the recorder AUTO PUNCH button, press the REC button.

Ending rehearsal or editing

A few seconds beyond the point at which you wish to stop rehearsal or editing, press the STOP button.

Carrying out a repeated rehearsal

Press the RTN button and AUTO PUNCH button simultaneously.
You can adjust the editing points while carrying out the repeated rehearsal.

Reviewing an edit

Use the following procedure to review an edit.

1 Set the recorder MASTER SAFE switch to ON, and press and light the ALL CHANNEL REPRO button.

2 On the recorder RM-3348HR, press the RECALL and IN buttons in that order.

The editing IN point appears in the LOCATE TIME display.

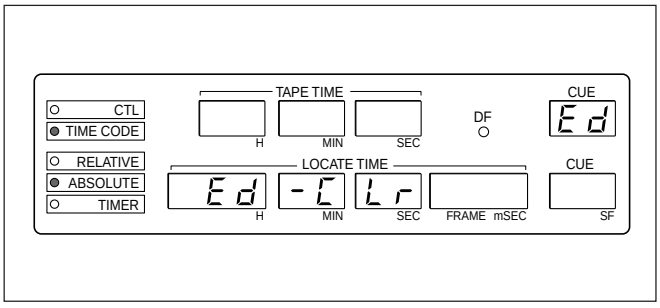
3 Holding down the RLB button on the recorder RM-3348HR, press the PLAY button.

Exiting from editor mode

Use the following procedure to exit from editor mode.

1 On the master and slave RM-3348HR units, press the 0, STORE, = and 0 buttons in that order.

The indication "Ed-Clr" appears in the LOCATE TIME display.



2 Press the ↑ button.

This exits from the editor mode.

Abandoning the editor mode exit operation

In Step **2** above, press the CLEAR button instead of the ↑ button.

9-6 Rehearsing Individual Editing Points

During editing, you can rehearse the vicinity of the recorder or player editing IN point.

Rehearsing on the recorder

Use the following procedure to rehearse on the recorder.

1 Press and extinguish the SLAVE button on the player RM-3348HR.

2 Press the player STOP button to stop the tape transport.

3 Press the recorder AUTO PUNCH button.

This carries out a rehearsal of the vicinity of the recorder editing IN point.

Rehearsing on the player

Use the following procedure to rehearse on the player.

1 Press and extinguish the SLAVE button on the player RM-3348HR.

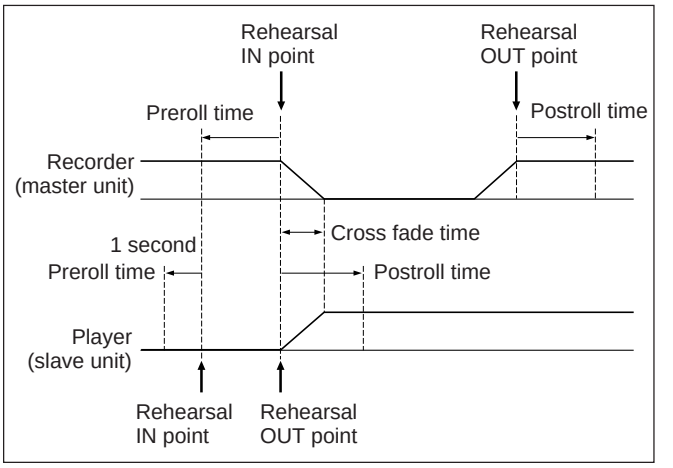
2 Set the player preroll time to at least 2 seconds.

For details on setting the preroll time see "4-8 Setting the Preroll Time" (page 4-28).

3 Press the player AUTO PUNCH button.

This automatically puts all channels of the player in the recording ready state, and carries out a rehearsal of the vicinity of the player editing IN point.
To prevent inadvertent recording, at this point the player REC button is disabled.

Automatic calculation of rehearsal IN and OUT point values



Rehearsal IN and OUT points

When rehearsing individual editing points, rehearsal IN and OUT point values on the player only are automatically calculated as shown in the diagram. However, execution of rehearsing does not actually change any editing points.

10-1-1 Overview

Different synchronization signals

You can use the following synchronization signals when using the PCM-3348HR digital copying function or for synchronized operation.

- **PCM-3348HR internal clock signal**
  Using the PCM-3348HR as the master unit, and the external digital audio equipment as the slave, the PCM-3348HR supplies this signal to the external digital audio equipment.

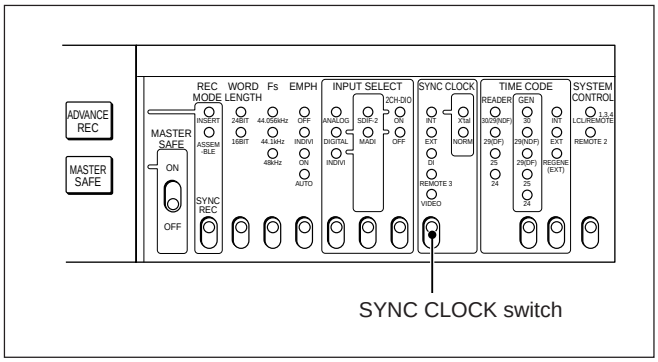
- **Word sync signal (sector sync signal, sector address signal)**
  Use these signals when phase synchronizing the external digital audio equipment to the sampling word signal.

- **Synchronization signal included in an AES/EBU format digital audio signal**
  Use this signal when making a digital copy through the AES/EBU connector.
  Below, this signal is referred to as an "AES/EBU format synchronization signal."

- **Composite video signal (composite video signal, composite sync signal, or black burst signal)**
  Use this signal for synchronizing with video equipment.

Switches used for external synchronization

PCM-3348HR system control block



System control block

SYNC CLOCK switch
Use this switch to select the synchronization signal used on the PCM-3348HR.

INT X'tal: PCM-3348HR highly-accurate internal master clock signal to operate the built-in AD/DA converter with a high quality. The variable speed function cannot be activated.

INT NORMAL: PCM-3348HR internal master clock to use the variable speed function.

EXT: Signal supplied by the device connected to the WORD SYNC INPUT connector on the rear panel of the PCM-3348HR

DI: AES/EBU format synchronization signal supplied by the device connected to the AES/EBU D-1 connector on the rear panel of the PCM-3348HR

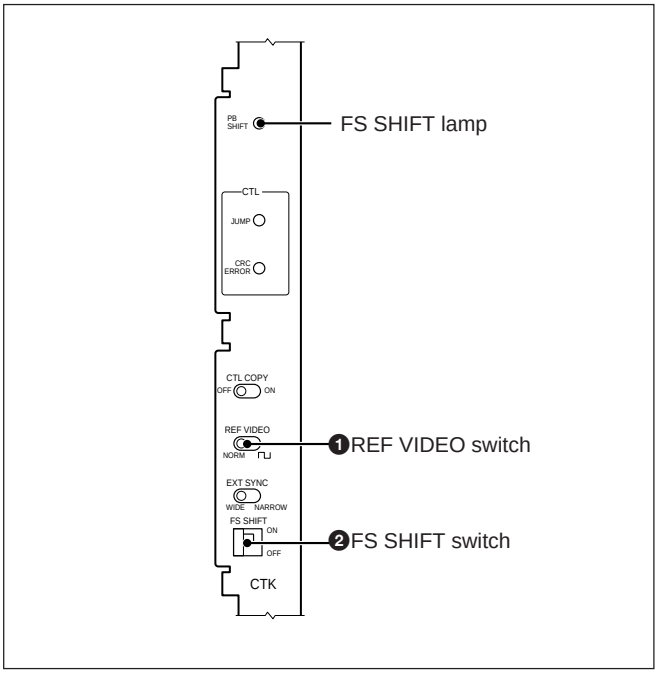
REMOTE 3: Signal input through the RM-3348HR

VIDEO: Signal supplied by the device connected to the REFERENCE VIDEO INPUT connector on the rear panel of the PCM-3348HR

When the SYNC CLOCK switch is set other than to INT, and no external synchronization signal is input

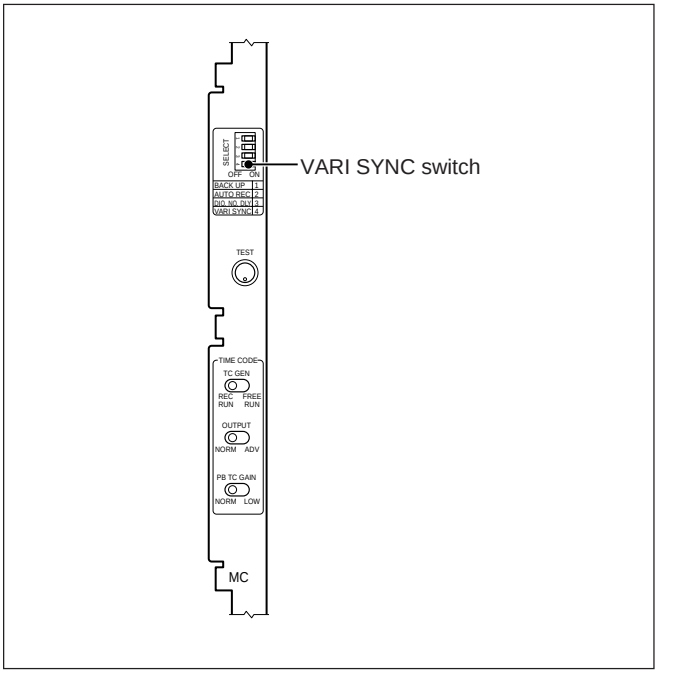
The PCM-3348HR uses the built-in master clock signal for synchronization. In this case, the INT lamp lights and the SYNC CLOCK lamp for the selected signal flashes.

CTK board



CTK board

MC board



MC board

❶ REF (reference) VIDEO switch

This selects the signal input to the REFERENCE VIDEO INPUT connector on the rear panel of the PCM-3348HR.

NORM: NTSC or PAL composite video signal

⊓⊔**:** square wave (integral multiples of 30 Hz, 29.97 Hz, 25 Hz, or 24 Hz)

For details on the settings required to obtain the frequency division of a square wave to obtain 30 Hz, 29.97 Hz, 25Hz or 24 Hz, see the explanation under "CTK board" (page A-22).

❷ FS (sampling frequency) SHIFT switch

This switch selects whether to use the sampling frequency set by the Fs switch on the PCM-3348HR system control block or to shift the frequency.

OFF: Normal mode (factory presetting)

ON: Sampling frequency shift mode

The actual operating sampling frequencies in this mode are as shown in the following table:

Fs switch setting	Lamps	Actual sampling frequency
44.1 kHz	44.1 kHz flashing	Shifts down by 0.1% from the set frequency
48.0 kHz	48.0 kHz flashing	Shifts down by 0.1% from the set frequency

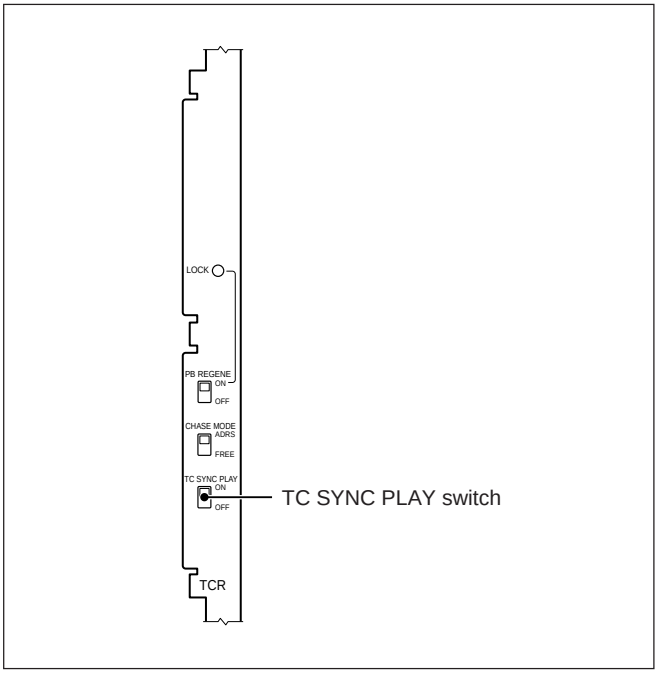
VARI SYNC switch

During time code sync playback or while carrying out playback speed control using the signal input to the EXT PHASE CONTROL INPUT connector, this switch selects whether or not to carry out vari-sync playback (variable speed playback).

ON: Carry out vari-sync playback.

OFF: Do not carry out vari-sync playback.

TCR board



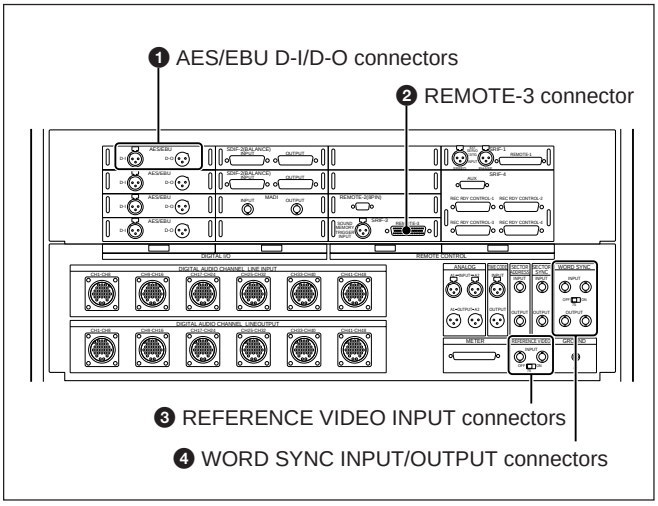
TCR board

TC (time code) SYNC PLAY switch
ON: Carry out time code sync playback.
OFF: Do not carry out time code sync playback.

Connectors used for synchronization signals

Use the following connectors for external synchronization.

PCM-3348HR



PCM-3348HR rear panel

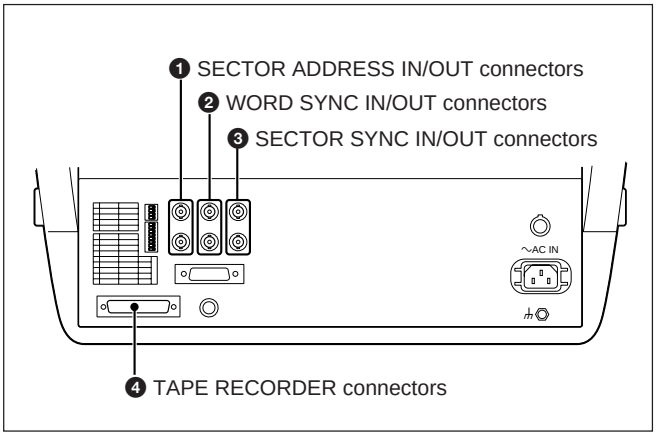
❶ AES/EBU D-I/D-O (digital audio input/digital audio output) connectors
These connectors input and output AES/EBU format digital audio signals including synchronization signals.

❷ REMOTE-3 connector
This connects to the RM-3348HR. When the SYNC CLOCK switch on the PCM-3348HR system control block is set to REMOTE 3, the word sync signal is input and output through this connector.

❸ REFERENCE VIDEO INPUT connectors
These connectors input a composite video signal. The two connectors are configured as loop-through connectors.

❹ WORD SYNC INPUT/OUTPUT connectors
These connectors input and output word sync signals. The two input connectors are configured as loop-through connectors.
The two output connectors output the same signal.

RM-3348HR


❶ SECTOR ADDRESS IN/OUT connectors
❷ WORD SYNC IN/OUT connectors
❸ SECTOR SYNC IN/OUT connectors
AC IN
❹ TAPE RECORDER connectors

RM-3348HR rear panel

❶ SECTOR ADDRESS IN/OUT (input/output) connectors

Connect the SECTOR ADDRESS OUT connector of the master unit to the SECTOR ADDRESS IN connector of the slave unit, to transfer the sector address signal.

❷ WORD SYNC IN/OUT (input/output) connectors

Connect the WORD SYNC OUT connector of the master unit to the WORD SYNC IN connector of the slave unit, to transfer the word sync signal.

❸ SECTOR SYNC IN/OUT (input/output) connectors

Connect the SECTOR SYNC OUT connector of the master unit to the SECTOR SYNC IN connector of the slave unit, to transfer the sector sync signal.

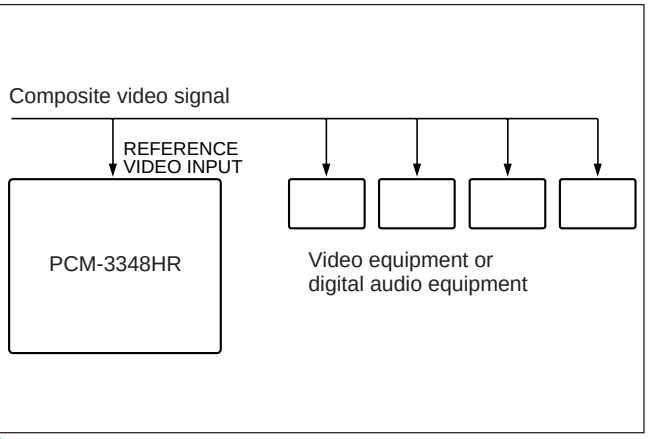
❹ TAPE RECORDER connector

Connect to the PCM-3348HR REMOTE-3 connector.

10-1-2 Basic Operations for External Synchronization

Using a composite video signal as the synchronization signal

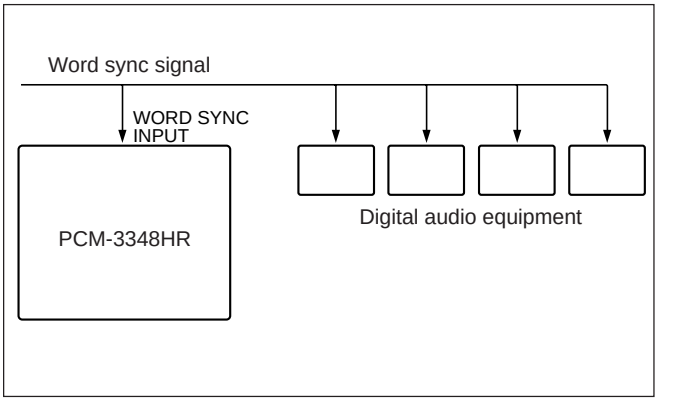
Use a loop-through configuration to distribute the composite video signal to the PCM-3348HR, the video equipment, the digital audio equipment and so forth.



Using a composite video signal as the synchronization signal

Using a word sync signal as the synchronization signal

Use a loop-through configuration to distribute the word sync signal supplied from digital audio equipment to the PCM-3348HR, digital audio equipment, and so forth.



Using a word sync signal as the synchronization signal

10-2 Using External Synchronization and Two Channel Digital Audio Input and Output

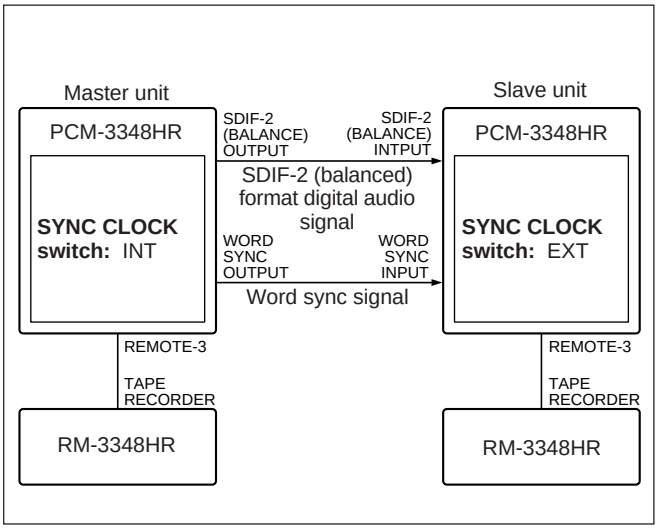
10-2-1 Using External Synchronization for PCM-3348HR Units

To synchronize two or three PCM-3348HR units, input and output the digital audio signal through the SDIF-2 (BALANCE) connector.

Synchronization signal connections

Example configuration

The example shows a word sync signal used for synchronization.



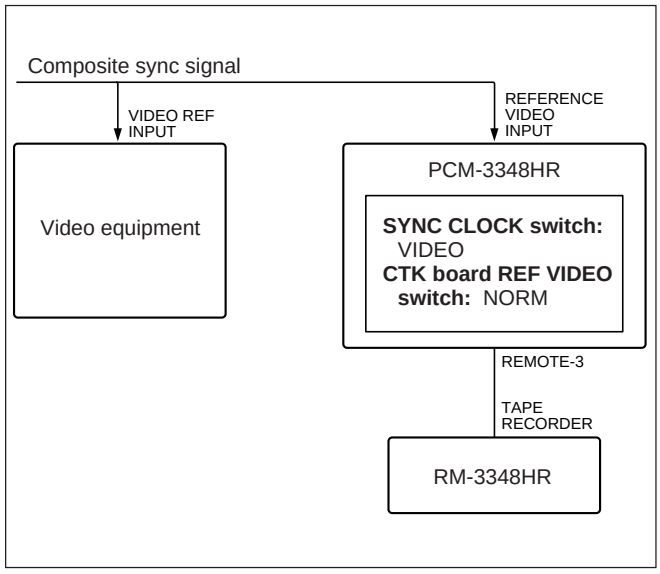
Example configuration for external synchronization of two PCM-3348HR units

10-2-2 Synchronization with Video Equipment

Synchronization signal connection

Example configuration

The example shows a composite sync signal used for synchronization.



Example configuration for synchronization with video equipment

Notes on system configuration

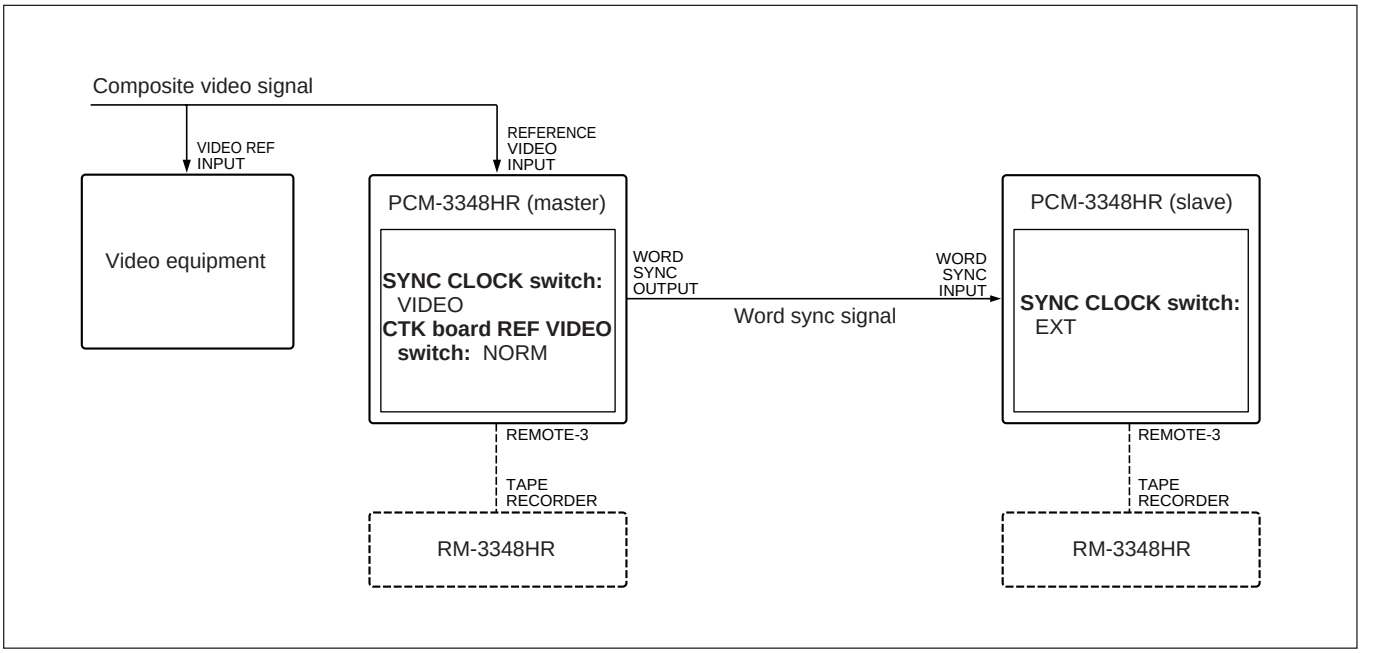
If using a tape recorded on the PCM-3324A/3324 system incorporating a VSU-3310 Vari-Sync Unit with the VSU-3310 FS SELECT key set to 44.056 kHz for playback or recording on the PCM-3348HR, set the FS SHIFT switch on the CTK board to ON, and set the Fs switch to 44.1 kHz. This allows the PCM-3348HR to operate with a sampling frequency of 44.056 kHz.

10-2-3 External Synchronization of Two PCM-3348HR Units with Video Equipment

Synchronization signal connections

Example configuration

In this example, the video equipment and master PCM-3348HR unit use composite video signal synchronization, and the master and slave PCM-3348HR units are synchronized by a word sync signal.

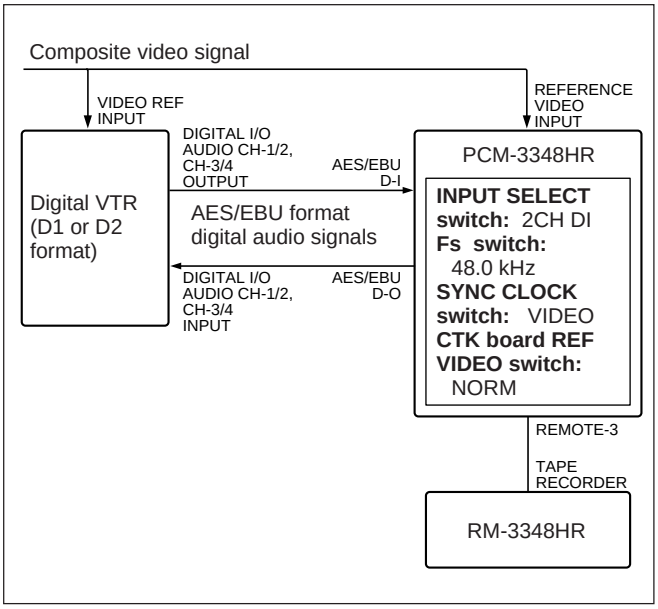


Example configuration for external synchronization of two PCM-3348HR unit with video equipment

10-2-4 Synchronization with a Digital VTR

Example synchronization signal connections (1)

This example illustrates connection to a D-1 or D-2 format digital VTR, using a composite video signal for synchronization, and inputting and outputting AES/EBU format digital audio signals.



Example configuration (1) for synchronization with a digital VTR

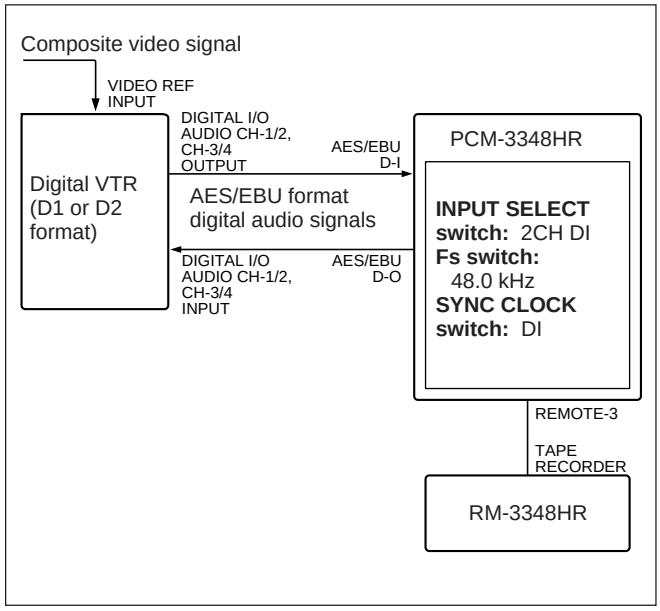
Notes on system configuration

- This system can only use a sampling frequency of 48.0 kHz.
- In the SETUP menu for the digital VTR, select DIGITAL for the audio input, and select channels 1/2 or 3/4 for the input.

For details of operation of the digital VTR, refer to the Operation Manual for the digital VTR.

Example synchronization signal connections (2)

This example illustrates connection to a D-1 or D-2 format digital VTR, using AES/EBU format synchronization signals for synchronization.



Example configuration (2) for synchronization with a digital VTR

Notes on system configuration

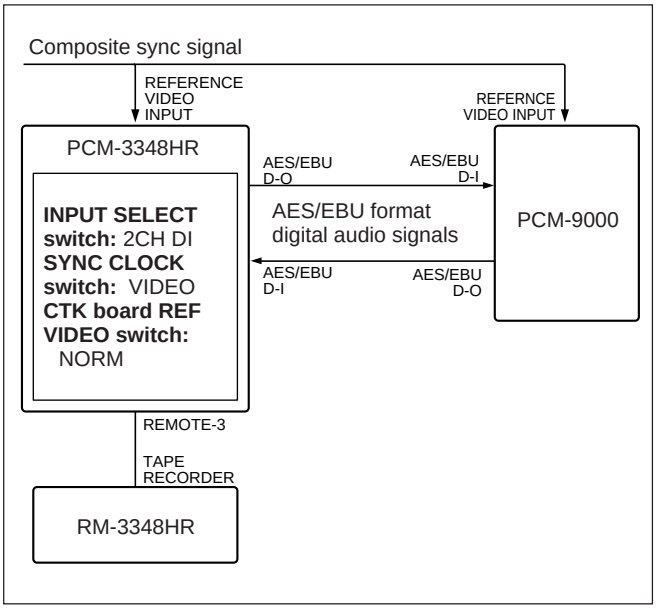
- This system can only use a sampling frequency of 48.0 kHz.
- In the SETUP menu for the digital VTR, select DIGITAL for the audio input, and select channels 1/2 or 3/4 for the input.

For details of operation of the digital VTR, refer to the Operation Manual for the VTR.

10-2-5 External Synchronization of a PCM-3348HR and a PCM-9000 Digital Master Disc Recorder

Example synchronization signal connections (1)

This example illustrates signal connections for using a composite sync signal for synchronization, and inputting and outputting AES/EBU format digital audio signals.



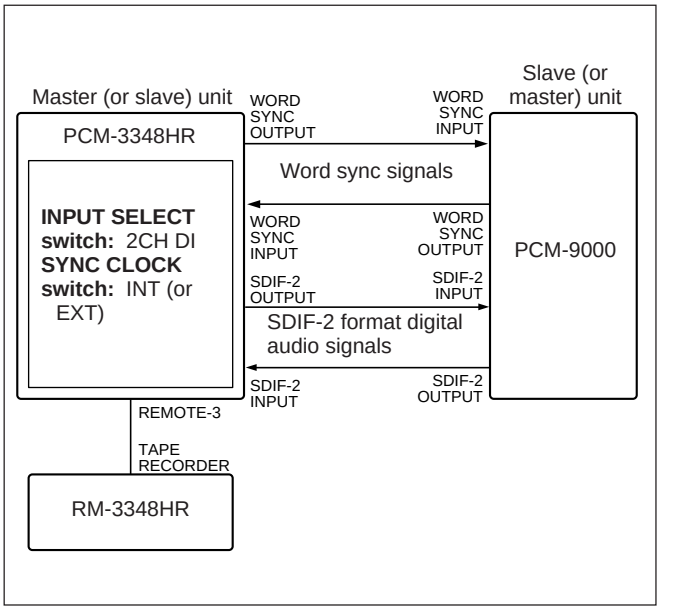
Example configuration (1) for external synchronization of a PCM-3348HR and a PCM-9000

Notes on system configuration

- This system can use a sampling frequency of 48.0 kHz, 44.1 kHz, or 44.056 kHz.
- It is not possible to use variable speed playback to make a digital copy.

Example synchronization signal connections (2)

This example illustrates signal connections for using a word sync signal for synchronization, and inputting and outputting SDIF-2 format digital audio signals.



Example configuration (2) for external synchronization of a PCM-3348HR and a PCM-9000

Notes on system configuration

- In this configuration the slave and master units must have the same sampling frequency. You can use 48.0 kHz, 44.1 kHz, or 44.056 kHz as the sampling frequency.
- Set the SYNC CLOCK switch to INT on the master PCM-3348HR unit, and to EXT on the slave PCM-3348HR unit.

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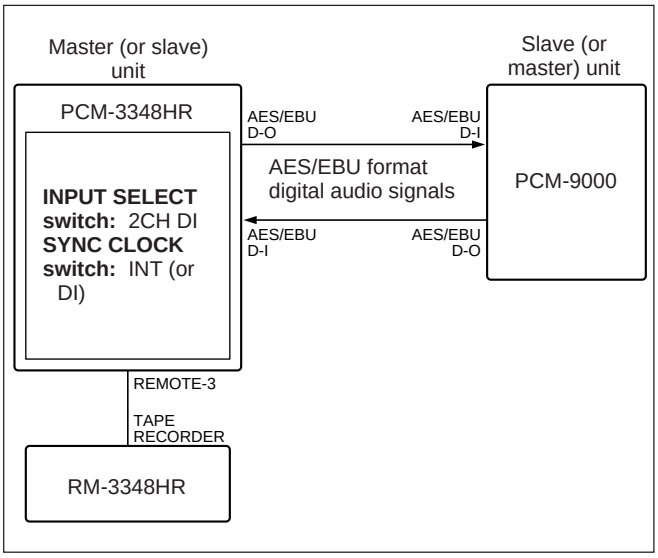
Example synchronization signal connections (3)

This example illustrates signal connections for using an AES/EBU format synchronization signal for synchronization.



Example configuration (3) for external synchronization of a PCM-3348HR and a PCM-9000

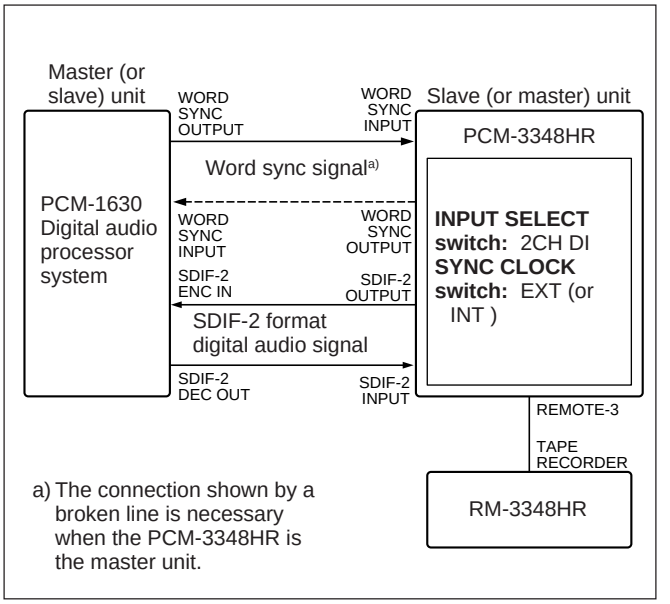
Notes on system configuration

- In this configuration the slave and master units must have the same sampling frequency. You can use 48.0 kHz, 44.1 kHz, 44.056 kHz as the sampling frequency.
- Set the SYNC CLOCK switch to INT on the master PCM-3348HR unit, and to DI on the slave unit.

10-2-6 External Synchronization of a PCM-3348HR with a PCM-1630 Digital Audio Processor System

Example synchronization signal connections (1)

This example illustrates signal connections for using a word sync signal for synchronization, and inputting and outputting SDIF-2 format digital audio signals.



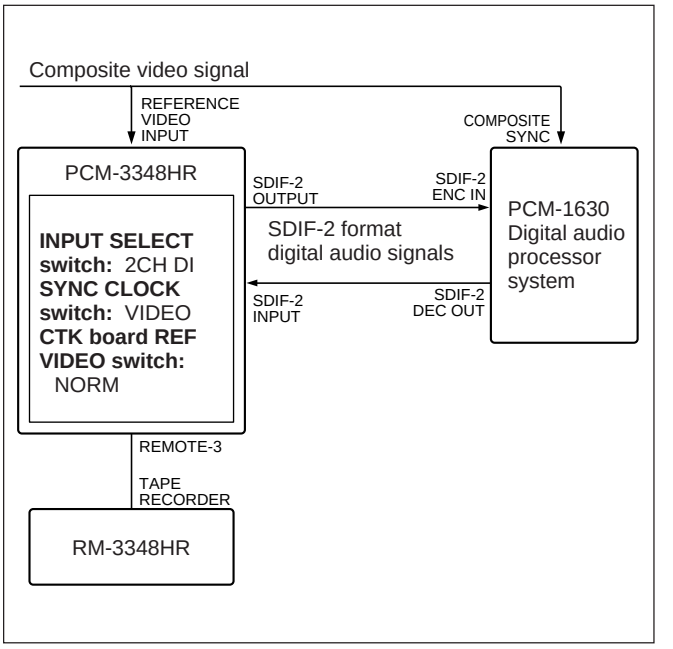
Example configuration (1) for external synchronization of a PCM-3348HR with a PCM-1630 system

Notes on system configuration

- In this configuration the slave and master units must have the same sampling frequency. You can use 48 kHz, 44.1 kHz or 44.056 kHz as the sampling frequency.
- Set the SYNC CLOCK switch to INT on the master PCM-3348HR unit, and to EXT on the slave unit.

Example synchronization signal connections (2)

This example illustrates signal connections for using a composite sync signal for synchronization, and inputting and outputting SDIF-2 format digital audio signals.



Example configuration (1) for external synchronization of a PCM-3348HR with a PCM-1630 system

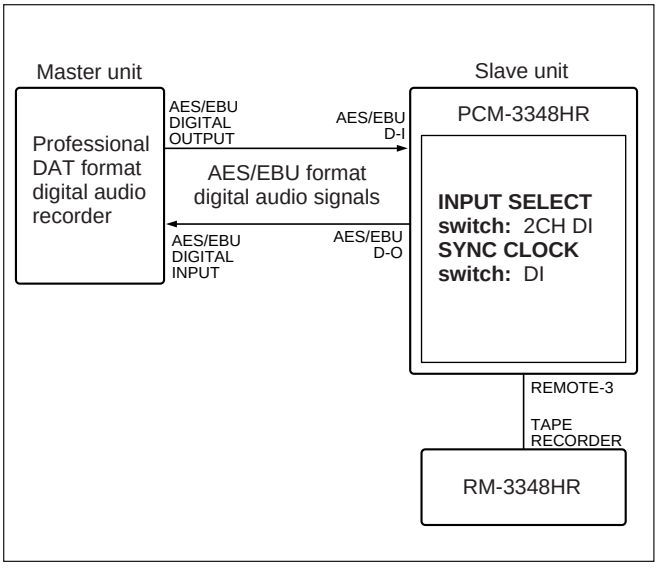
Notes on system configuration

- This system can only use a sampling frequency of 44.056 kHz.
- Connecting video equipment to this configuration allows operation synchronized to the video equipment.

10-2-7 External Synchronization of a PCM-3348HR with a Professional DAT Format Digital Audio Recorder

Example synchronization signal connections (1)

This example has the PCM-3348HR as the slave unit, and uses AES/ EBU format synchronization signals for synchronization.



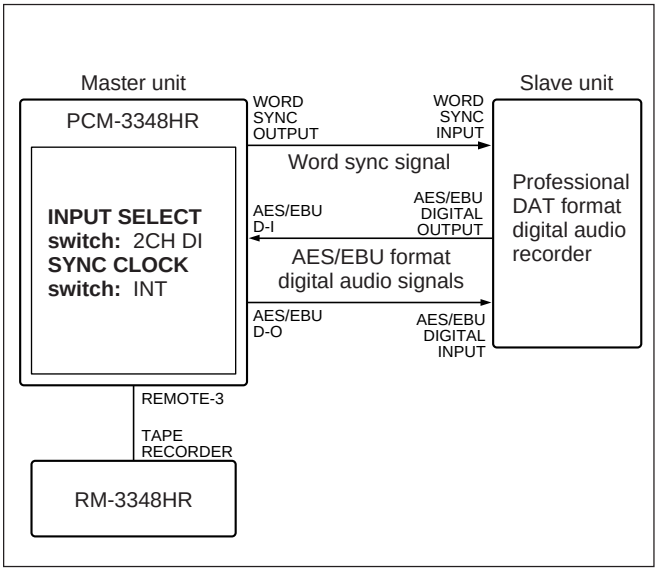
Example configuration (1) for external synchronization of a PCM-3348HR with a professional DAT format digital audio recorder

Note on system configuration

In this configuration the slave and master units must have the same sampling frequency. You can use 48.0 kHz, 44.1 kHz or 44.056 kHz as the sampling frequency.

Example synchronization signal connections (2)

This example has the PCM-3348HR as the master unit, and uses a word sync signal for synchronization, while inputting and outputting AES/ EBU format digital audio signals.



Example configuration (2) for external synchronization of a PCM-3348HR with a professional DAT format digital audio recorder

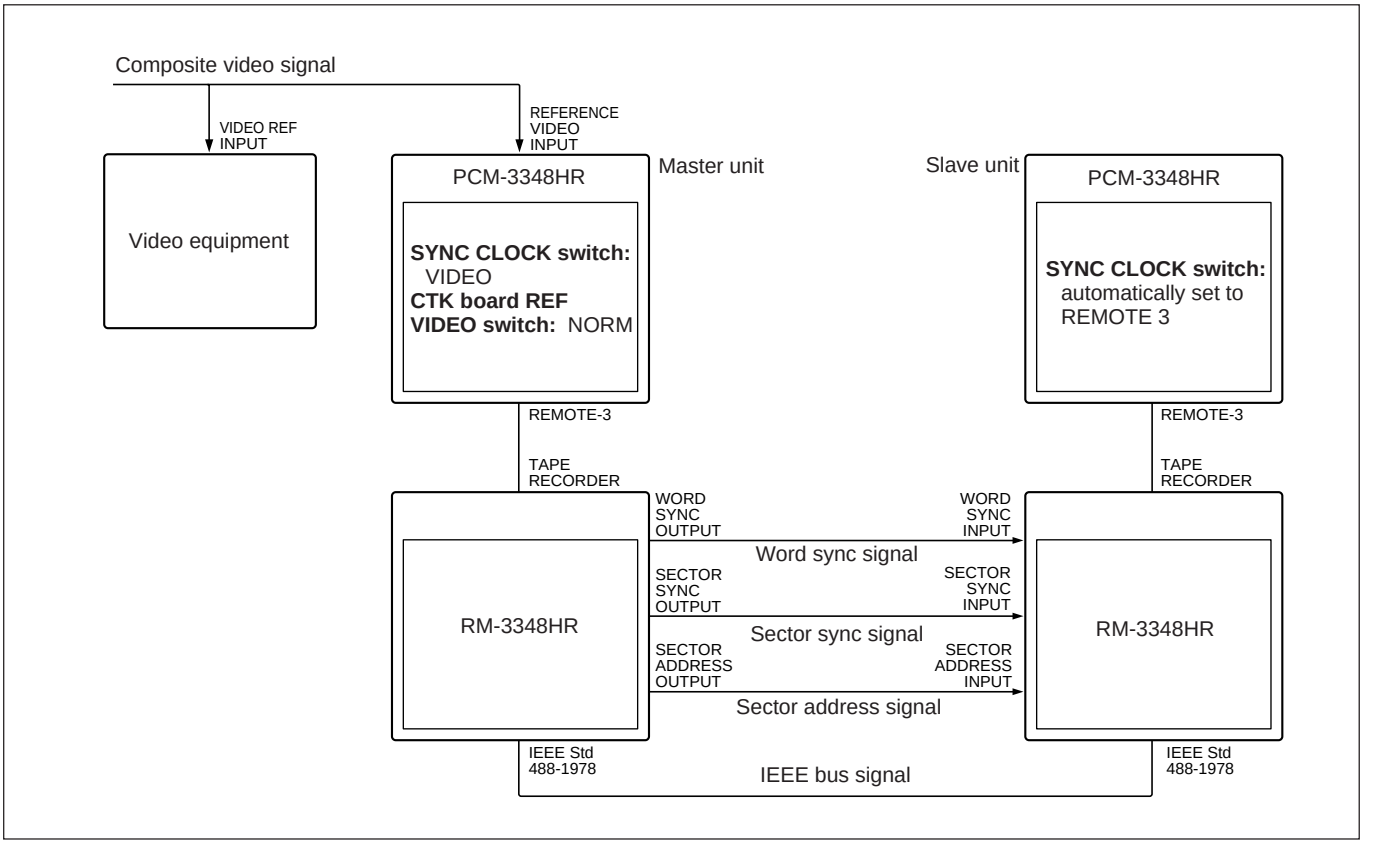
Notes on system configuration

- In this configuration the slave and master units must have the same sampling frequency. You can use 48.0 kHz, 44.1 kHz or 44.056 kHz as the sampling frequency.
- It is possible to add a third or fourth digital audio device to this configuration, for synchronized operation. In this case, use the PCM-3348HR as the master unit, make loop-through connections to the third and fourth digital audio devices, and terminate with the professional DAT format digital audio recorder.

10-2-8 Combining External Synchronization to Video Equipment and Sector-Based External Synchronization

Example connections

This example illustrates two or three PCM-3348HR units connected for sector-based synchronization using RM-3348HR Remote Control Units, with video equipment also connected for synchronized operation.



Example configuration for combining external synchronization to video equipment and sector-based external synchronization

Note on system configuration

You can use a PCM-3348 unit as a slave unit.

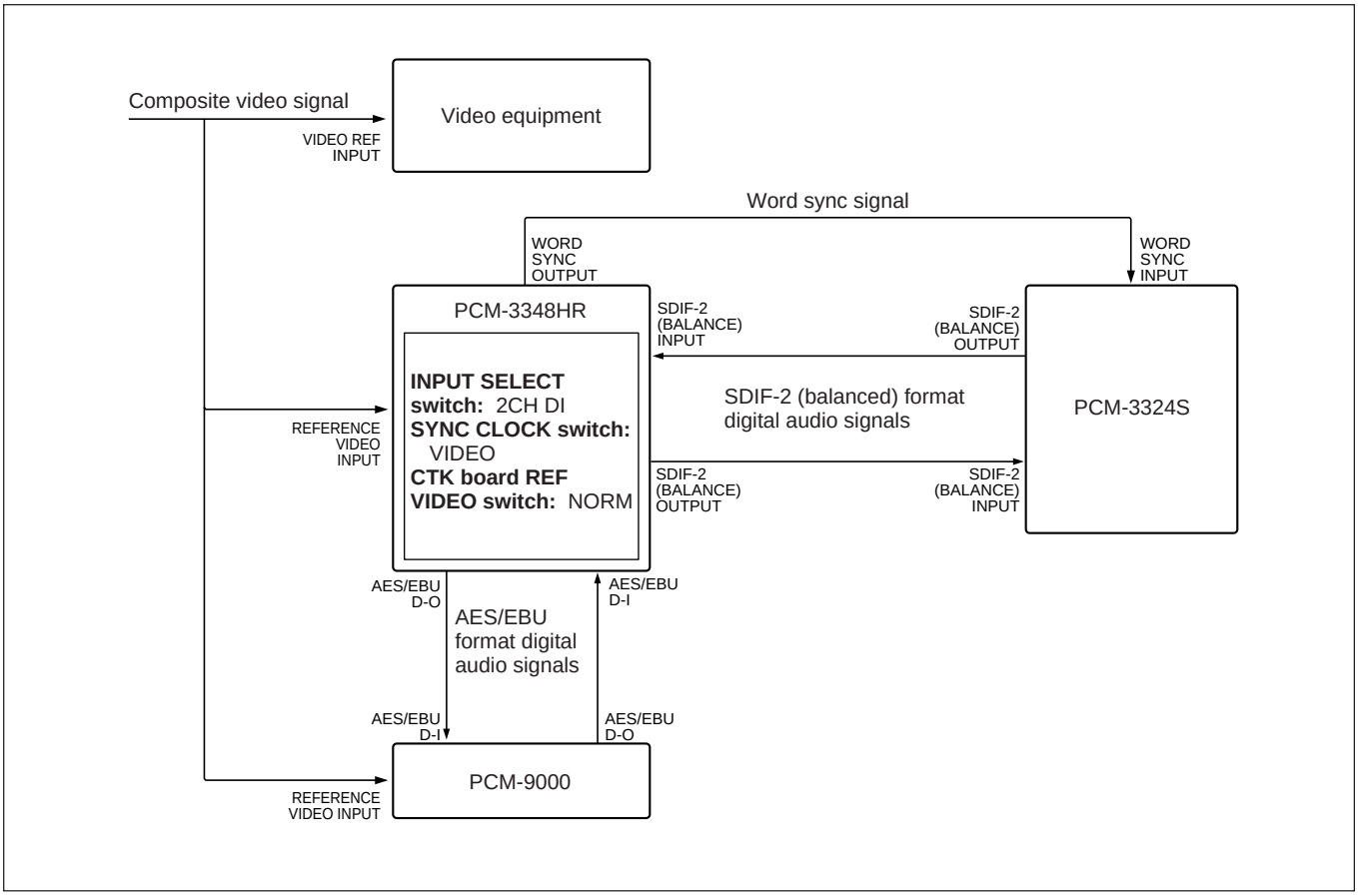
10-2-9 Combination with Video Equipment and Other Digital Audio Equipment

Example synchronization signal connections (1)

This example use a PCM-3324S Digital Audio Recorder and PCM-9000 Digital Master Disc Recorder as the digital audio equipment.
The video equipment, PCM-3348HR and PCM-9000 are synchronized by a composite video signal, and the PCM-3324S uses a word sync signal for external synchronization.
The input and output of digital audio signals use the SDIF-2 (BALANCE) INPUT/OUTPUT connectors and AES/EBU D-I/D-O connectors simultaneously.

Notes on system configuration

- In this configuration the slave and master units must have the same sampling frequency. You can use 48.0 kHz, 44.1 kHz or 44.056 kHz as the sampling frequency.
- If using this configuration with an additional time code synchronizer for synchronized operation, set the VARI SYNC switch on the PCM-3348HR MC board to OFF. If this switch is set to ON, this results in variable speed playback, and the digital I/O synchronization with the PCM-9000 will be lost.



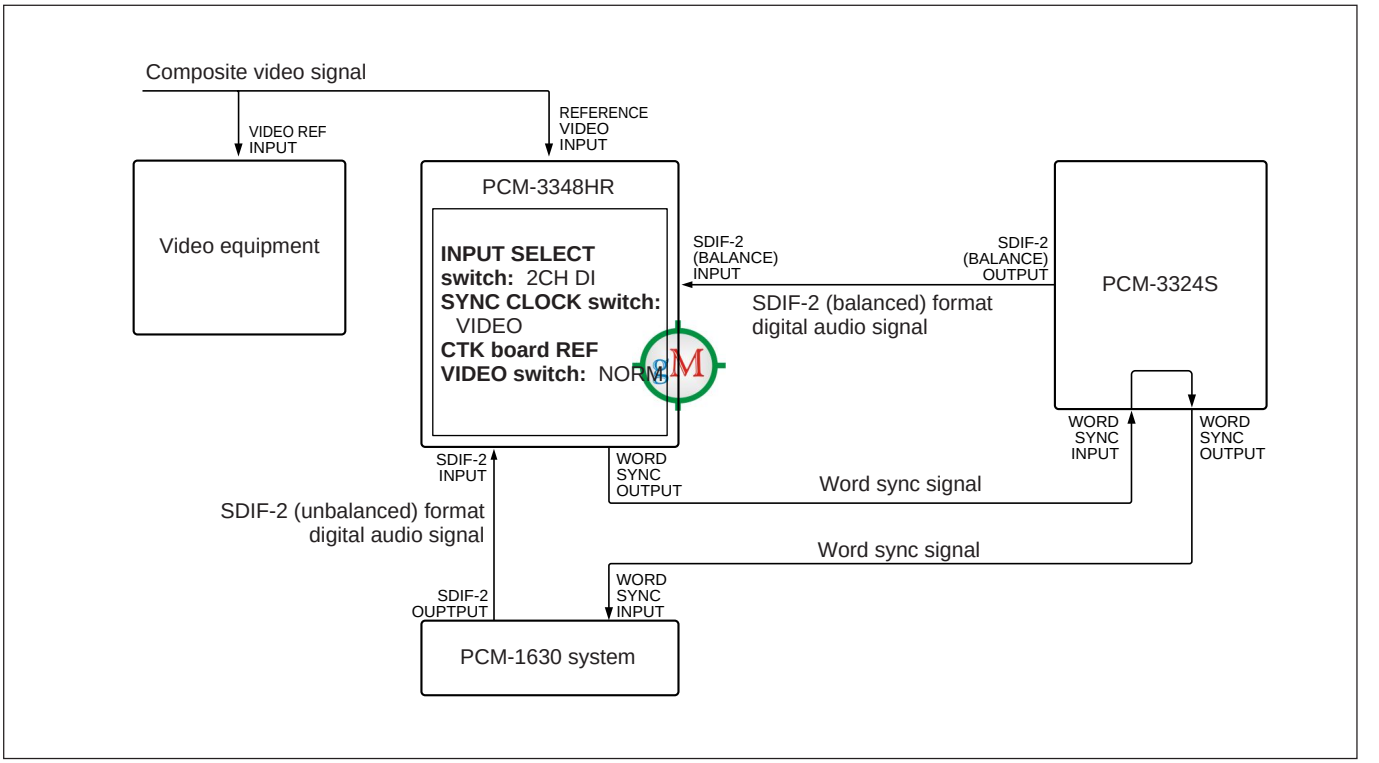
Example configuration (1) for combination with video equipment and other digital audio equipment

Example synchronization signal connections (2)

This example uses a PCM-3324S Digital Audio Recorder as the other digital audio device, and a PCM-1630 Digital Audio Processor system.
The video equipment and PCM-3348HR are synchronized by a composite video signal, and the PCM-3324S and PCM-1630 system both use a word sync signal for synchronization. The digital audio signal input uses the SDIF-2 (BALANCE) INPUT connector and SDIF-2 (UNBALANCE) INPUT connector simultaneously.

Notes on system configuration

- In this configuration the slave and master units must have the same sampling frequency. You can use 44.1 kHz or 44.056 kHz as the sampling frequency.
- If using this configuration with an additional time code synchronizer for synchronized operation, set the VARI SYNC switch on the PCM-3348HR MC board to OFF. If this switch is set to ON, this results in variable speed playback, and the digital I/O synchronization with the PCM-1630 system will be lost.



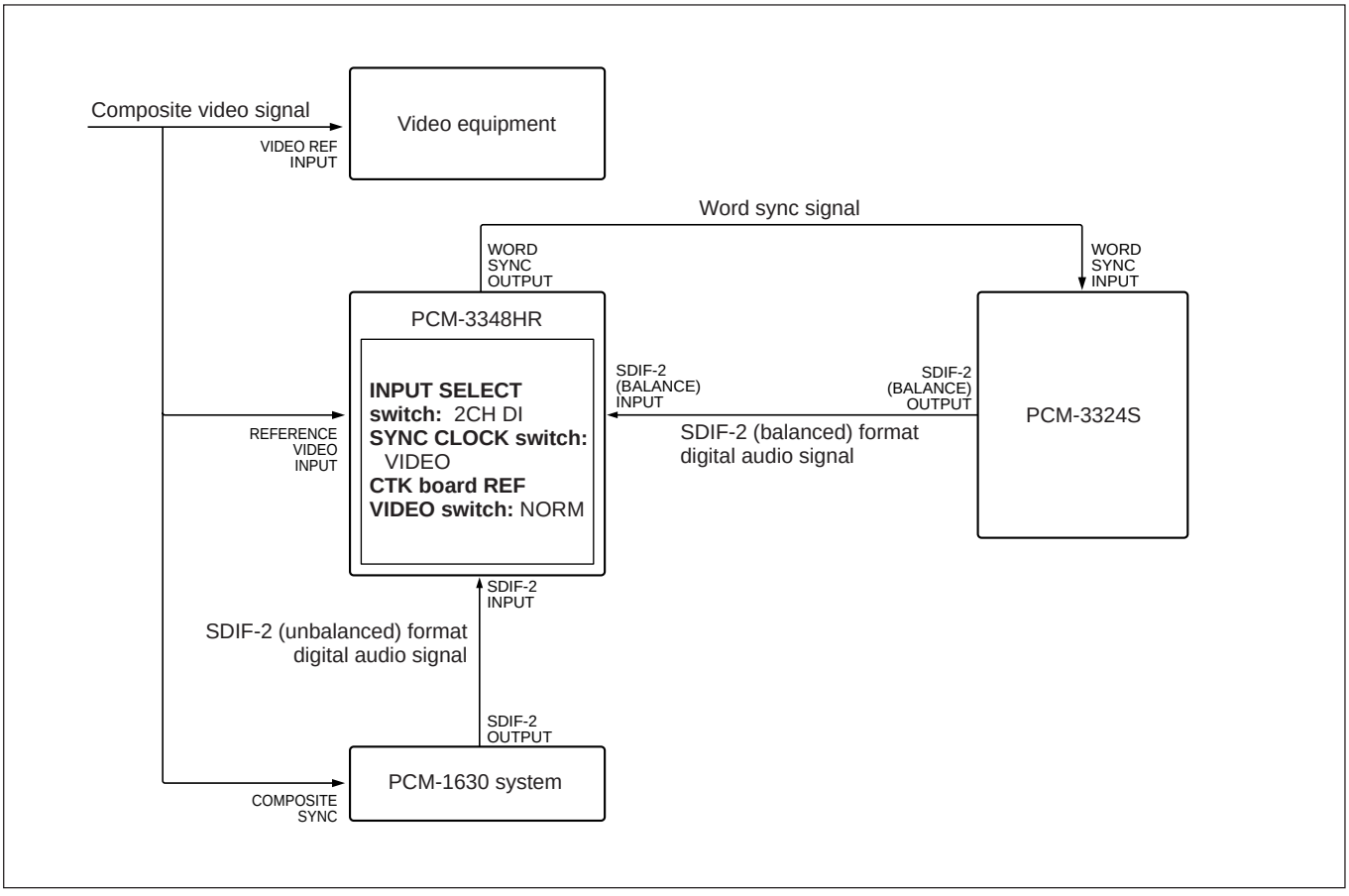
Example configuration (2) for combination with video equipment and other digital audio equipment

Example synchronization signal connections (3)

This example uses a PCM-3324S Digital Audio Recorder and a PCM-1630 Digital Audio Processor system. It uses a word sync signal to synchronize the PCM-3324S, and a composite video signal to synchronize the PCM-1630 system, the PCM-3348HR, and the video equipment. The digital audio signal input uses the SDIF-2 (BALANCE) INPUT connector and SDIF-2 (UNBALANCE) INPUT connector simultaneously.

Notes on system configuration

- In this configuration the sampling frequency must be 44.056 kHz.
- Set the sampling frequency for the PCM-3324S to 44.1 kHz.
  If using a tape recorded on the PCM-3324S for playback on the PCM-3348HR in 16 bit mode, set the FS SHIFT switch on the PCM-3348HR CTK board to ON.
- If using this configuration with an additional time code synchronizer for synchronized operation, set the VARI SYNC switch on the PCM-3348HR MC board to OFF. If this switch is set to ON, this results in variable speed playback, and the digital I/O synchronization with the PCM-1630 system will be lost.



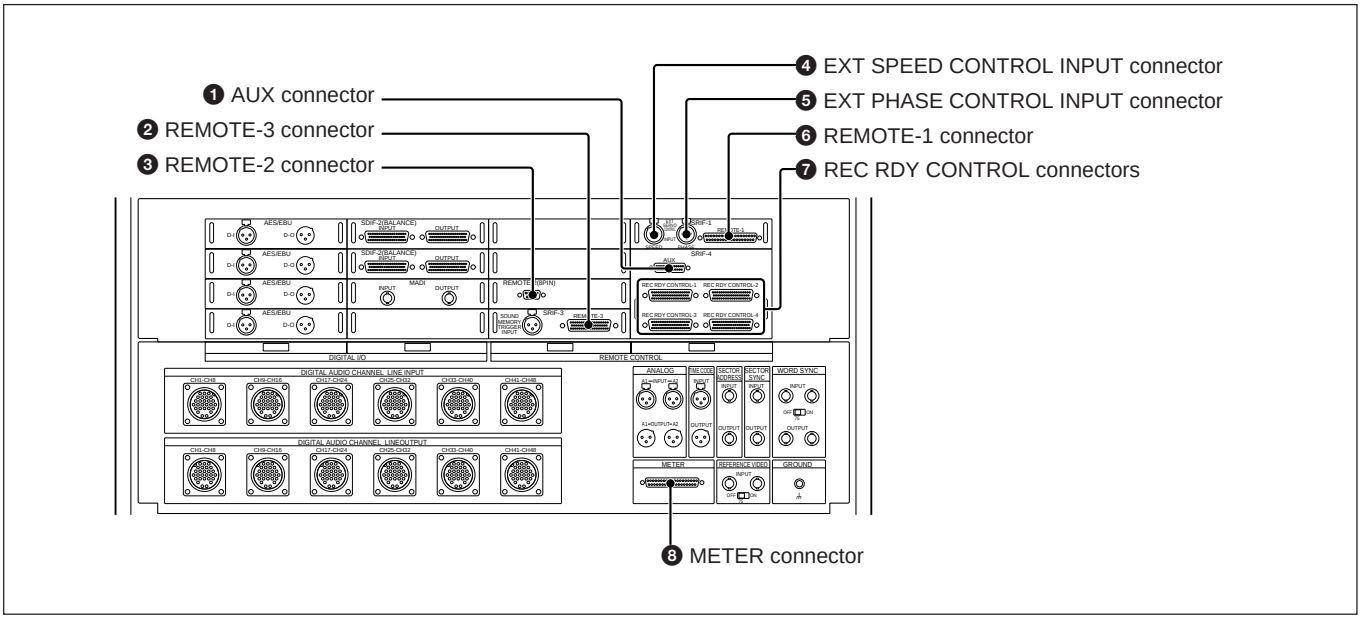
Example configuration (3) for combination with video equipment and other digital audio equipment

11-1 Remote Control Connectors and Peripheral Equipment

11-1-1 Remote Control Connectors

PCM-3348HR remote control connectors

The following remote control connectors are provided on the PCM-3348HR rear panel.



PCM-3348HR remote control connectors

1

Connecting a mixing console with a channel recording ready control (channel REC READY) function to this connector allows you to switch the PCM-3348HR time code channel and analog audio channels A1 and A2 between the recording enabled (REC READY) and recording inhibited (SAFE) states from the mixing console.

2

Connect an RM-3348HR Remote Control Unit.

3

Connect a video editing control unit.

4

Supplying from –10 V to +10 V DC to this connector allows you to continuously vary the tape transport speed by from –16 m/s to +16 m/s.

5

Supplying from –10 V to +10 V DC to this connector allows you to continuously vary the playback speed. The relationship between the voltage applied and the variation in the speed is as follows.

Voltage applied and the playback speed variation

DC voltage	Change in playback speed	
	VARI SYNC switch: ON	VARI SYNC switch: OFF
–10.0 V	–12.5%	–50.0%
–2.5 V	–12.5%	–12.5%
0 V	0%	0%
+2.5 V	+12.5%	+12.5%
+10.0 V	+12.5%	+50.0%

6

Connect a time code synchronizer to this connector to control the tape transport speed.

❼ REC RDY (record ready) CONTROL connectors

Connecting a mixing console with a channel REC READY function to this connector allows you to switch the PCM-3348HR digital audio channels between the recording enabled (REC READY) and recording inhibited (SAFE) states from the mixing console.

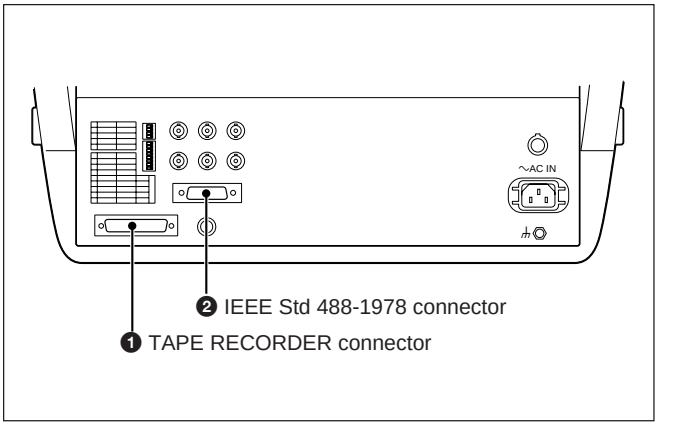
Each REC RDY CONTROL connector controls channels as follows:

Connector No.	Channels
1	1 to 12 CH
2	13 to 24 CH
3	25 to 36 CH
4	37 to 48 CH

[illegible]

Connect a DMU-3048 Digital Meter Unit (optional).

RM-3348HR remote control connectors



RM-3348HR remote control connectors

[illegible]

Connect to the PCM-3348HR.

[illegible]

When using more than one PCM-3348HR unit together for synchronized operation, connect this connector to the other RM-3348HR unit(s).

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11-1-2 Building a System Using Time Codes

When building a system using time codes, the technique used depends on whether the PCM-3348HR is the master unit or the slave unit.

- [illegible] Time code sync playback
- [illegible] Phase control using an external synchronizer

Time code sync playback

When using the PCM-3348HR as the master unit and the video equipment as the slave unit, use the time code sync playback function for synchronized operation. With this function, the tape transport operates so that the phase of the time code sync signal played back on the PCM-3348HR is synchronized with the vertical sync signal in the composite video signal input to the PCM-3348HR.
When using video equipment with the PCM-3348HR for dubbing into existing recordings, any deviation between the PCM-3348HR and the video equipment is controlled to less than one frame, so that at editing points no discrepancies occur within the time code frame.
There are two methods for time code sync playback.

Using the vari-sync function

Varying the frequency of the word sync signal by the phase difference between the input composite video signal and the playback time code, the PCM-3348HR carries out phase synchronization by variable-speed playback. Using this method, you can listen to the playback sound during phase synchronization. The phase synchronization is also very accurate, since the phase difference between the time code and video signal is in the range of 0 to –2Hsync (two horizontal video line scan intervals).
However, in a system using digital I/O, when the PCM-3348HR word sync signal is varied, the synchronization with external equipment using the word sync signal is lost, so this method cannot be used.

Without using the vari-sync function

This carries out phase synchronization without affecting the word sync signal.
Use this method in a configuration using digital I/O.
During phase synchronization, it is not possible to listen to the playback sound. The phase synchronization accuracy is ±1 sector (±1 millisecond when the sampling frequency is 48.0 kHz).

Switch settings

[illegible] switched on or off by the TC SYNC PLAY switch on the TCR board.

[illegible] switched on or off by the VARI SYNC switch on the MC board.

For details on switch positions and specific operations, refer to “3-7-8 Time Code Sync Playback” (page 3-25).

External phase synchronization using a synchronizer

When using the video equipment as the master unit and the PCM-3348HR as the slave unit, use an external synchronizer to phase-synchronize the PCM-3348HR. There are two methods for external phase control, as follows.

Using the vari-sync function

By varying the voltage input from the synchronizer via the EXT PHASE CONTROL INPUT connector of the PCM-3348HR, the frequency of the word sync signal is varied, and this results in variable-speed playback, which thus enables the phase synchronization.
Using this method, you can listen to the playback sound during phase synchronization. The phase synchronization is also more accurate than in the method not using the vari-sync function.
However, in a system using digital I/O, when the PCM-3348HR word sync signal is varied, the synchronization with external equipment using the word sync signal is lost, so this method cannot be used.

Without using the vari-sync function

This method controls the capstan motor according to the voltage supplied via the EXT PHASE CONTROL INPUT connector of the PCM-3348HR by the synchronizer.
Use this method in a configuration using digital I/O.
During phase synchronization, it is not possible to listen to the playback sound. The phase synchronization accuracy is ±1 block (±250 microseconds when the sampling frequency is 48.0 kHz).

Switch settings

[illegible] switched on or off by the VARI SYNC switch on the MC board.

For details on switch positions and specific operations, see “3-7-8 Time Code Sync Playback” (page 3-25).

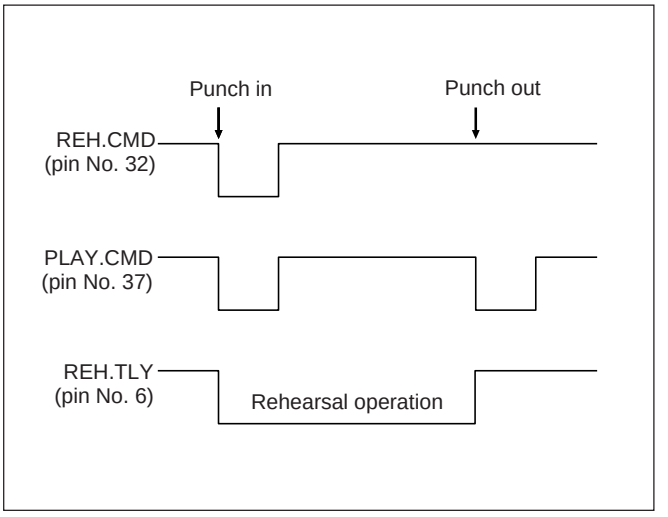
11-1-3 Rehearsal Control Using a Synchronizer

It is possible to carry out rehearsal control, using a synchronizer connected to the REMOTE-1 connector on the PCM-3348HR.
For details of the pin assignments of the REMOTE-1 connector, see Appendix (A-16).

Rehearsal control signals and rehearsal execution

Rehearsal command signal and rehearsal tally signal

The rehearsal command signal (REH.CMD) corresponds to pressing the REH button. When the PCM-3348HR receives an REH command and PLAY command simultaneously, the REH and PLAY buttons on the RM-3348HR light, and a rehearsal is carried out.

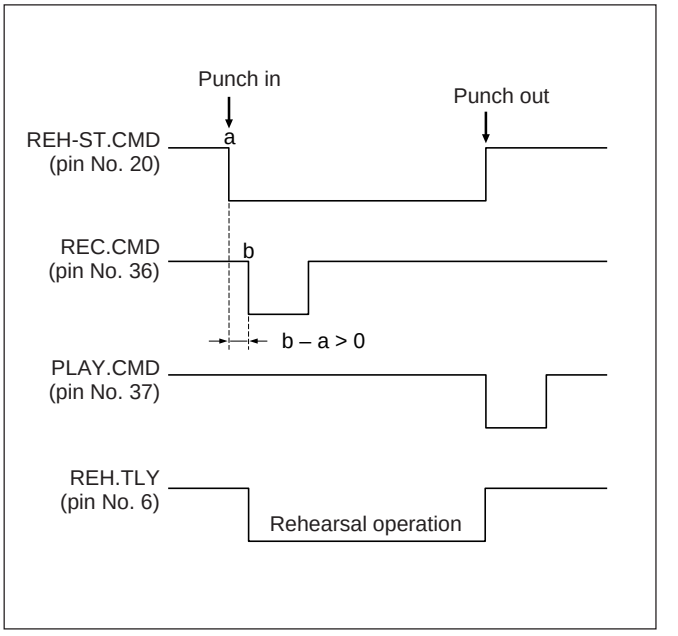


Rehearsal command signal and rehearsal tally signal

Rehearsal status command signal and rehearsal tally signal

The rehearsal status command signal (REH-ST.CMD) corresponds to the rehearsal status output of the synchronizer.

- Connect the rehearsal status output of the synchronizer to pin No. 20 of the PCM-3348HR REMOTE-1 connector. The rehearsal status command signal is active between the punch in point and punch out point while a synchronizer rehearsal operations being carried out.
- To send REC and PLAY commands from the synchronizer, set the synchronizer event control function so that the REC command signal is output at the punch in point, and the PLAY command signal at the punch out point.
- If the PCM-3348HR receives a REC command while the rehearsal status command signal is active, the REH and PLAY buttons on the RM-3348HR light, and a rehearsal is carried out.
  If the PCM-3348HR receives a PLAY command while the rehearsal status command signal is active, the REH button on the RM-3348HR goes off, and a punch out is carried out.



Rehearsal status command signal and other signals

Using the synchronizer event control function

This section describes the procedure to set the synchronizer event control function so that the REC command signal is output at the punch in point, and the PLAY command signal at the punch out point.

1 Connect the rehearsal status command output of the synchronizer to pin No. 20 of the PCM-3348HR REMOTE-1 connector.

2 Produce the logical sum (OR) of the synchronizer event output and the tape transport output REC command signal, and connect to pin No. 36 of the PCM-3348HR REMOTE-1 connector.

3 Produce the logical sum (OR) of another synchronizer event output and the tape transport output PLAY command signal, and connect to pin No. 37 of the PCM-3348HR REMOTE-1 connector.

4 Select the rehearsal function on the synchronizer.

5 Set the punch in and punch out points on the synchronizer.

6 Using the synchronizer event control function, set the trigger address.

1) Set the event 1 trigger address (the event output connected in step **2** above) as the in point.

2) Set the event 2 trigger address (the event output connected in step **3** above) as the out point.

3) Start the synchronizer event control function.

For details of synchronizer settings and operations, refer to the synchronizer Operation Manual.

11-1-4 Peripheral Equipment

DMU-3048 Digital Meter Unit

This is a peak meter, capable of displaying the levels of 48 digital audio channels. It also has out-of range, recording (REC) and recording enabled (REC READY) indications, and a peak hold and calibration functions.
You can use this meter to monitor the status of all 48 digital audio channels from a remote location.

11-2 Playback Signal Output Timing with a Mixing Console

There are two timing modes for outputting the playback signal.

[illegible]

The playback signal is output with a delay equal to the time for digital signal processing, so that there is no phase difference between the signal being recorded and the playback signal.

[illegible]

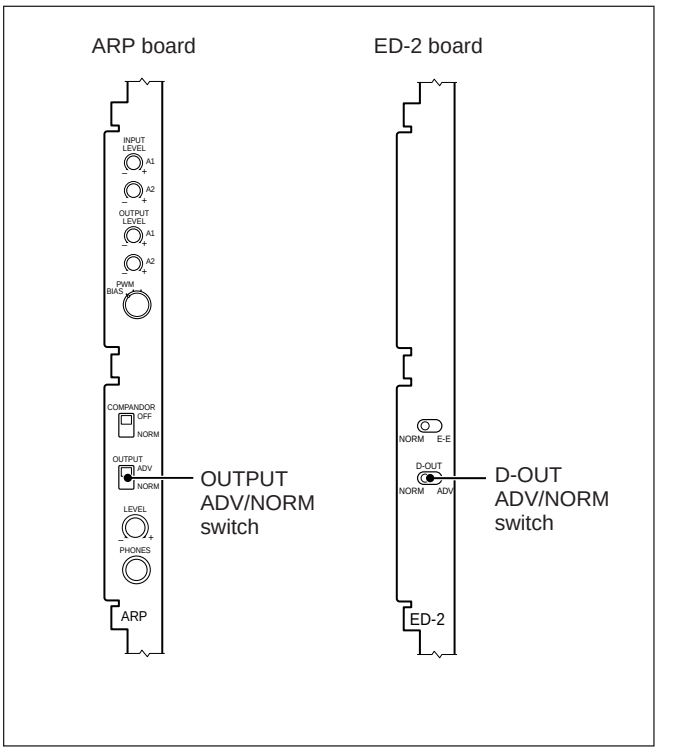
The playback signal is output with a timing ahead of that for normal output mode.

Normal output mode

Use this mode to carry out insert recording or assemble recording with the playback signal using an analog mixing console while monitoring the playback signal. Since there is no phase difference between the recording signal and playback signal, you can monitor the cross fade from the playback signal to the input signal at a punch-in point.

Selecting normal output mode

Use the following procedure.



Selection normal output mode

1 Set the OUTPUT ADV/NORM switch on the PCM-3348HR ARP board to NORM.

This causes the analog audio channel playback signals to be output in normal output mode.

2 Set the D-OUT ADV/NORM switch on the PCM-3348HR ED-2 board to NORM.

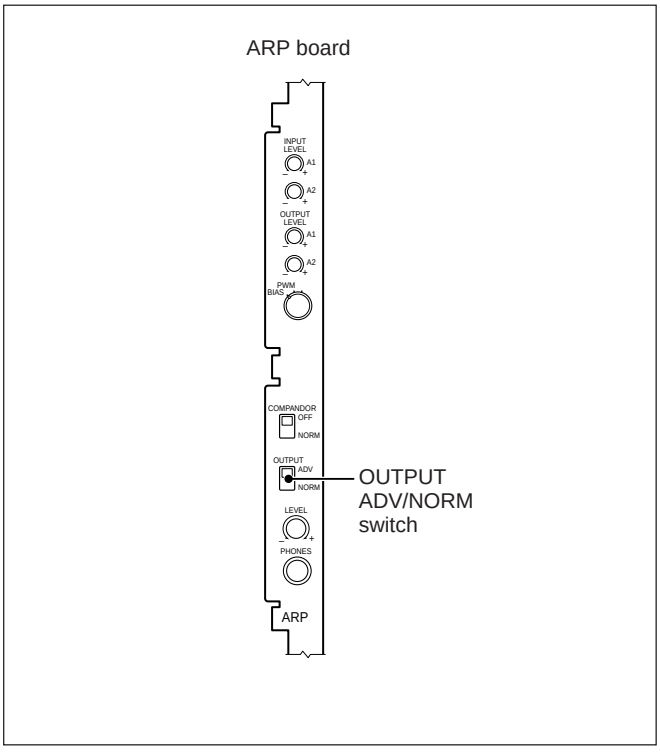
This causes the digital audio channel playback signals to output in normal output mode.

Analog audio signal advanced output mode

In this mode, the delay between the signal being played back and being output is eliminated.

Setting analog audio signals to advanced output mode

Set the OUTPUT ADV/NORM switch on the PCM-3348HR ARP board to ADV.
This causes the analog audio channel playback signals to be output with no delay.



Setting analog audio signals to advanced output mode

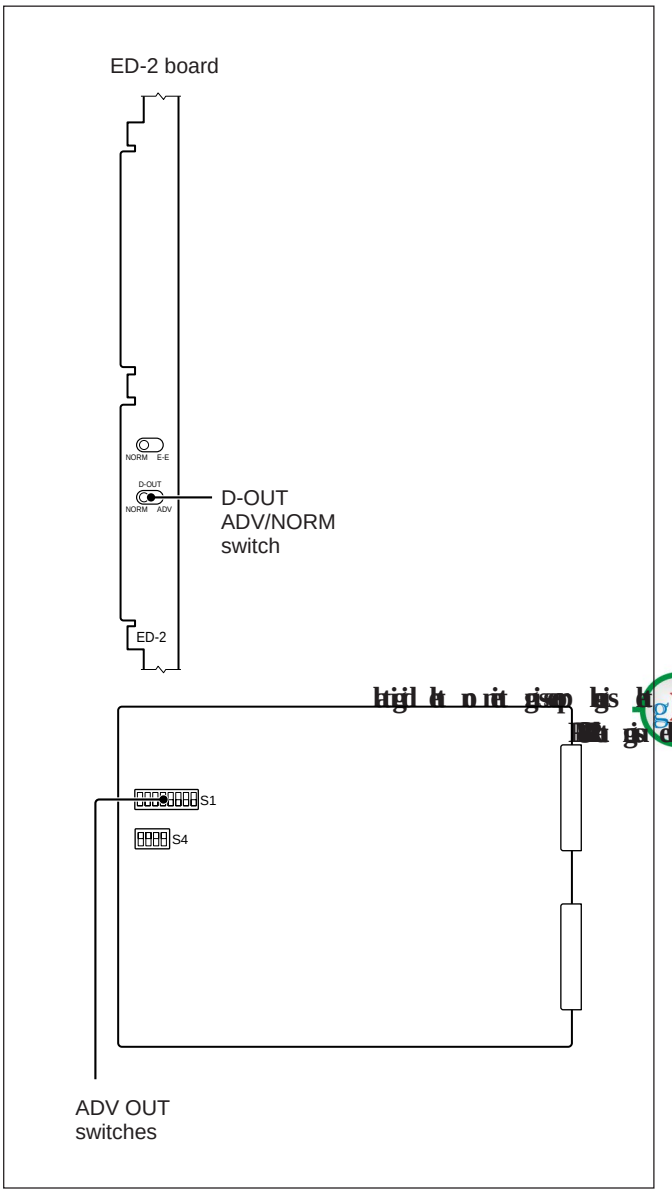
Digital audio signal advanced output mode

When using a digital mixing console, since signal processing within the mixing console requires a certain amount of time, if the digital audio channel playback signals are output in normal output mode, the monitor signal lags perceptibly behind actual playback. In digital audio signal advanced output mode, the playback signal is output earlier by just the time required for signal processing in the digital mixing console so that the monitor signal and playback signal outputs coincide. Using this mode allows you to carry out dubbing over existing tapes while monitoring the playback signal, even with a system that uses a digital mixing console. However, since this mode only allows the playback signal to be monitored, it is not possible to monitor the cross fade from the playback signal to the input signal at a punch-in point.

11-2 Playback Signal Output Timing with a Mixing Console

Setting digital audio signals to advanced output mode

Use the following procedure.



Setting digital audio signals to advanced output mode

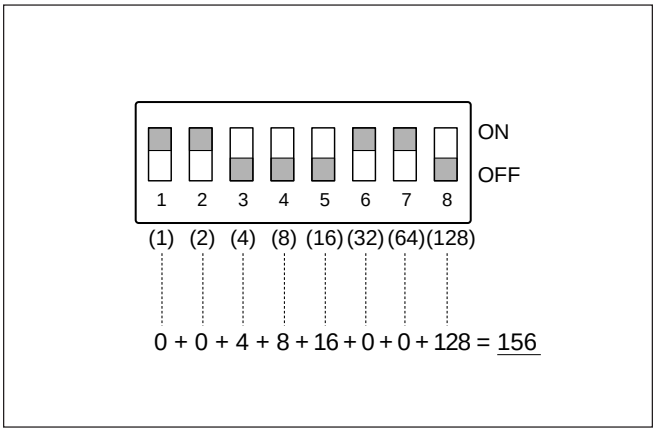
1 Set the D-OUT ADV/NORM switch on the PCM-3348HR ED-2 board to ADV.

2 Set the ADV OUT switches on the ED-2 board to the number of words representing the signal processing time on the digital mixing console you are using.

The signal processing time can be set to between 0 and 255 words.

Setting the ADV OUT switches

The ADV OUT switches are eight DIP switches, representing the number of words of advance in binary. (Each switch indicates a binary one when it is in the position adjacent to the numeral.) In the example below, the digital audio signal playback output is advanced 156 words compared with the normal playback output mode.



Setting the ADV OUT switches

Proceed as follows:

1 Set all the ADV OUT switches on the PCM-3348HR ED-2 board to ON.

2 Set the D-OUT ADV/NORM switch on the PCM-3348HR ED-2 board to ADV.

3 Of the numeric buttons on the RM-3348HR, press 1, 2, 3, STORE, =, and 7 in that order.

The LOCATE TIME display of the RM-3348HR shows “AdV oN123” for a second, and the signal processing time on the digital mixing console is set to 123 words.

11-3 Example System Configurations

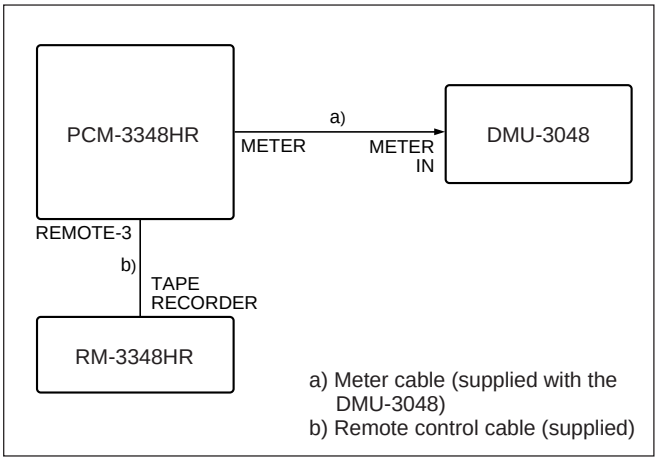
This section illustrates some example system configurations using the remote control connectors of the PCM-3348HR and RM-3348HR.

11-3-1 Connecting a Digital Meter Unit

Connecting a digital meter unit (optional) allows you to monitor the state of all channels of the PCM-3348HR from a remote location.

The connections are the same for any system configuration.

System configuration



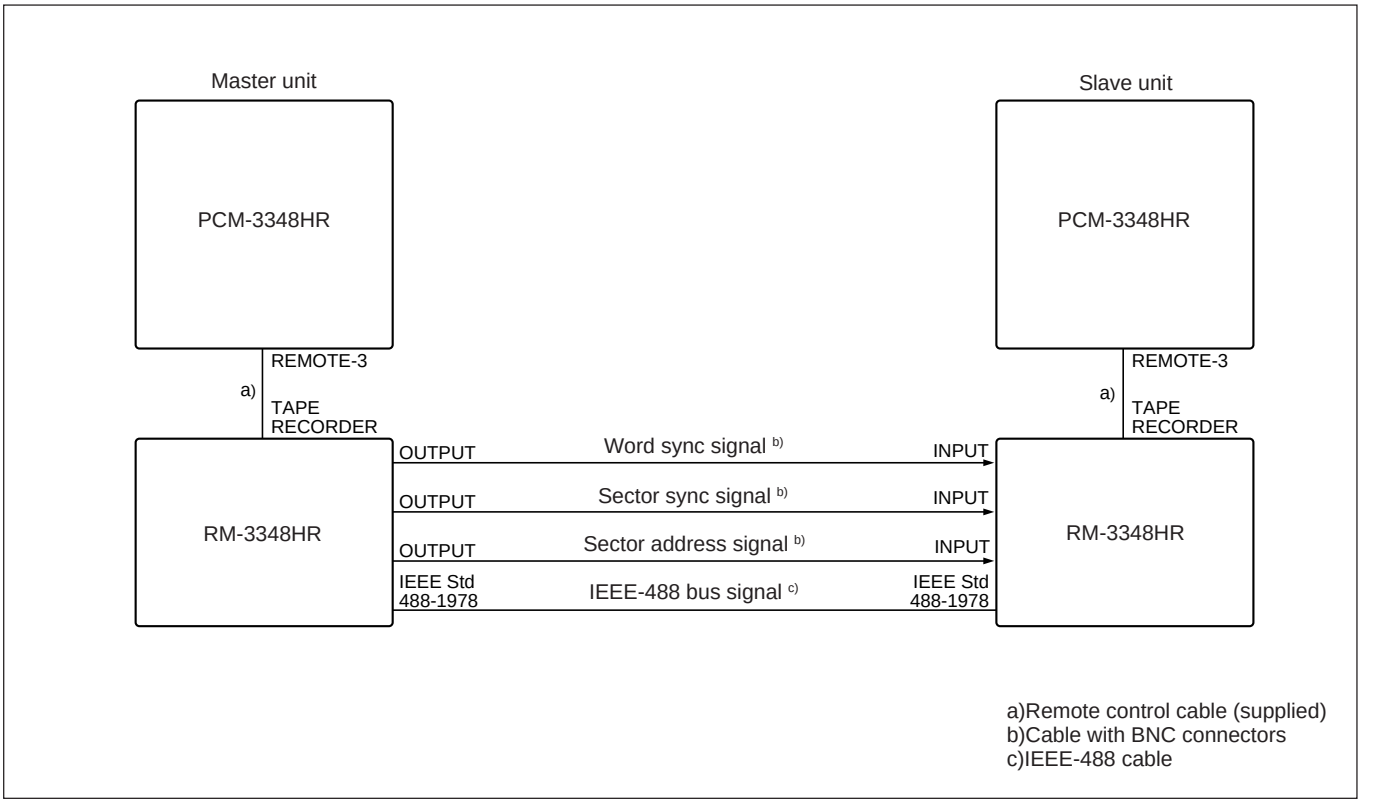
Connecting a digital meter unit

11-3 Example System Configurations

11-3-2 Synchronized Operation of PCM-3348HR Units (Sector-Based Synchronization)

In this configuration, word sync signals, sector sync signals and sector address signals are transferred through the RM-3348HR, for synchronized operation of the PCM-3348HR units.

System configuration



Synchronized operation of PCM-3348HR units

Switch settings

PCM-3348HR settings

Switch	Master unit	Slave unit
REC MODE	INSERT	INSERT
SYNC CLOCK	INT	Set automaticaly
Fs	Set Automatically	Set the same as the master unit

RM-3348HR settings

Switch	Master unit	Slave unit
SELECTOR switch No.2 (lower)	ON (MASTER)	OFF (SLAVE)
SELECTOR switch No.4 to 8 (lower)	No.4: OFF No.5: OFF No.6: OFF No.7: OFF No.8: OFF Device address: 00H	No.4: OFF No.5: OFF No.6: OFF No.7: OFF No.8: ON Device address: 01H
SLAVE button	OFF	ON
Timer display mode	CTL ABSOLUTE or CTL RELATIVE	CTL ABSOLUTE or CTL RELATIVE

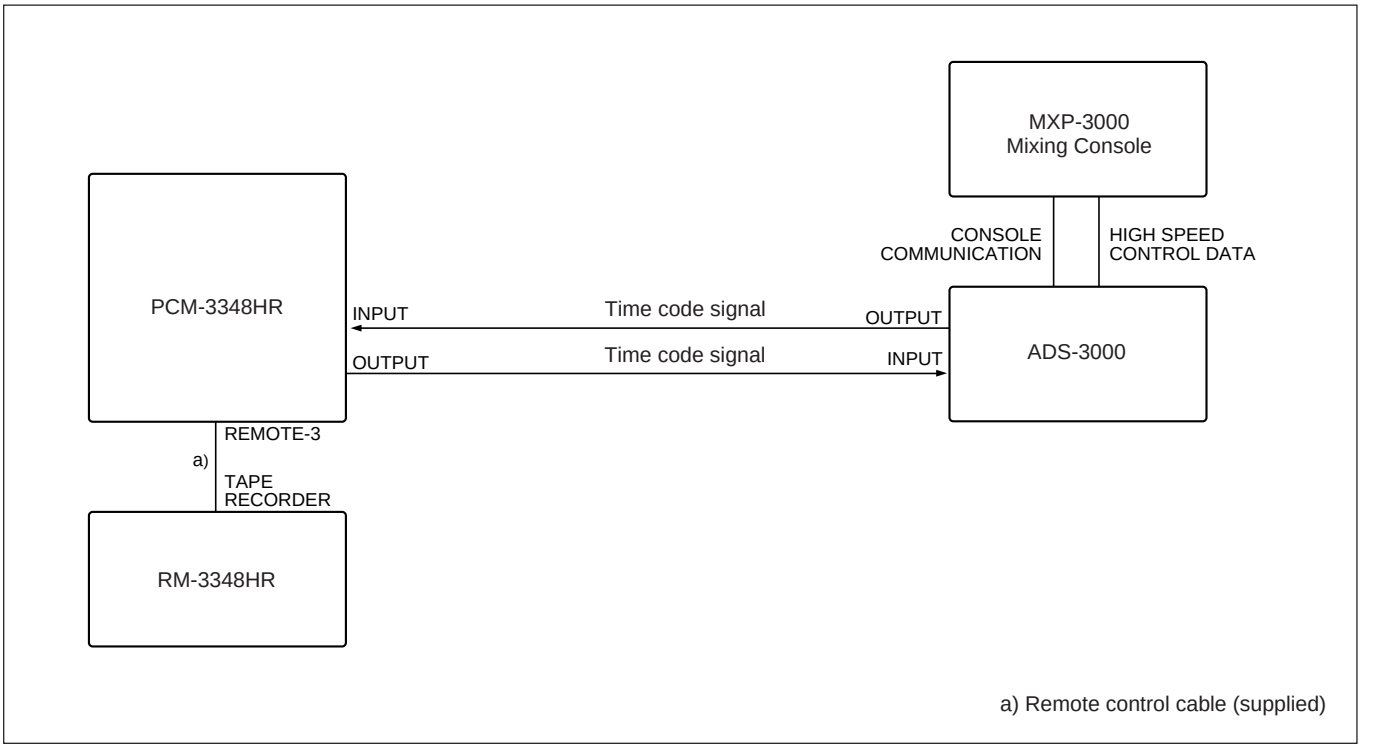
Notes on operation

- Use cables with BNC connectors to connect the word sync, sector sync and sector address signals.
- The two PCM-3348HR units must have the same sampling frequency.
- Use a prestriped tape and carry out insert recording.
- The tape on the slave unit must be prestriped with the same sampling frequency as the master unit.

11-3-3 Mixing Automation System (No Tape Remote Function)

This is a mixing automation system such as an MXP-3000 system or GML system, using a time code slave mode mixing console.
The mixing console operates following the PCM-3348HR playback time code.

System configuration



Mixing automation system (no tape remote function)

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Switch settings

PCM-3348HR settings

Operation	Switch	Setting
Advance recording	REC MODE	ADVANCE
	SYNC CLOCK	INT
	TIMER MODE	CTL ABSOLUTE
	Fs	Any
	TIME CODE selection	EXT
	TIME CODE GEN format selection	Format used
Dubbing	REC MODE	INSERT
	SYNC CLOCK	INT
	TIMER MODE	CTL ABSOLUTE or CTL RELATIVE or TIME CODE
	Fs	Set automatically
	TIME CODE selection	REGENE (EXT)
	TIME CODE GEN format selection	Format used

RM-3348HR settings

Switch	Setting
SELECTOR switch No.2 (lower)	ON (MASTER)
SELECTOR switches No.4 to No.8 (lower)	No.4: OFF No.5: OFF No.6: OFF No.7: OFF No.8: OFF Device address: 00H

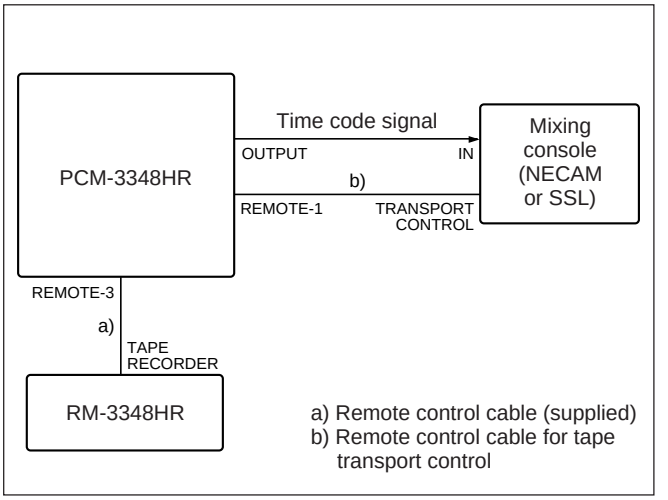
Notes on operation

- Carry out all PCM-3348HR control from the RM-3348HR.
- When recording on a blank tape, use advance recording.
- For recording on a prestriped tape or for dubbing over an existing recording, use insert recording.

11-3-4 Mixing Automation System (With Tape Remote Function)

This is a mixing automation system such as a NECAM system, using a mixing console with a tape remote function.

System configuration



Mixing automation system (with tape remote function)

Switch settings

PCM-3348HR settings

Operation	Switch	Setting
Advance recording	REC MODE	ADVANCE
	SYNC CLOCK	INT
	TIMER MODE	CTL ABSOLUTE
	Fs	Any
	TIME CODE selection	INT
	TIME CODE GEN format selection	Format used
	TC GEN (MC board)	REC RUN
Dubbing	REC MODE	INSERT
	SYNC CLOCK	INT
	TIMER MODE	CTL ABSOLUTE or CTL RELATIVE or TIME CODE
	Fs	Set automatically
	TIME CODE selection	REGENE (EXT)
	TIME CODE GEN format selection	Format used

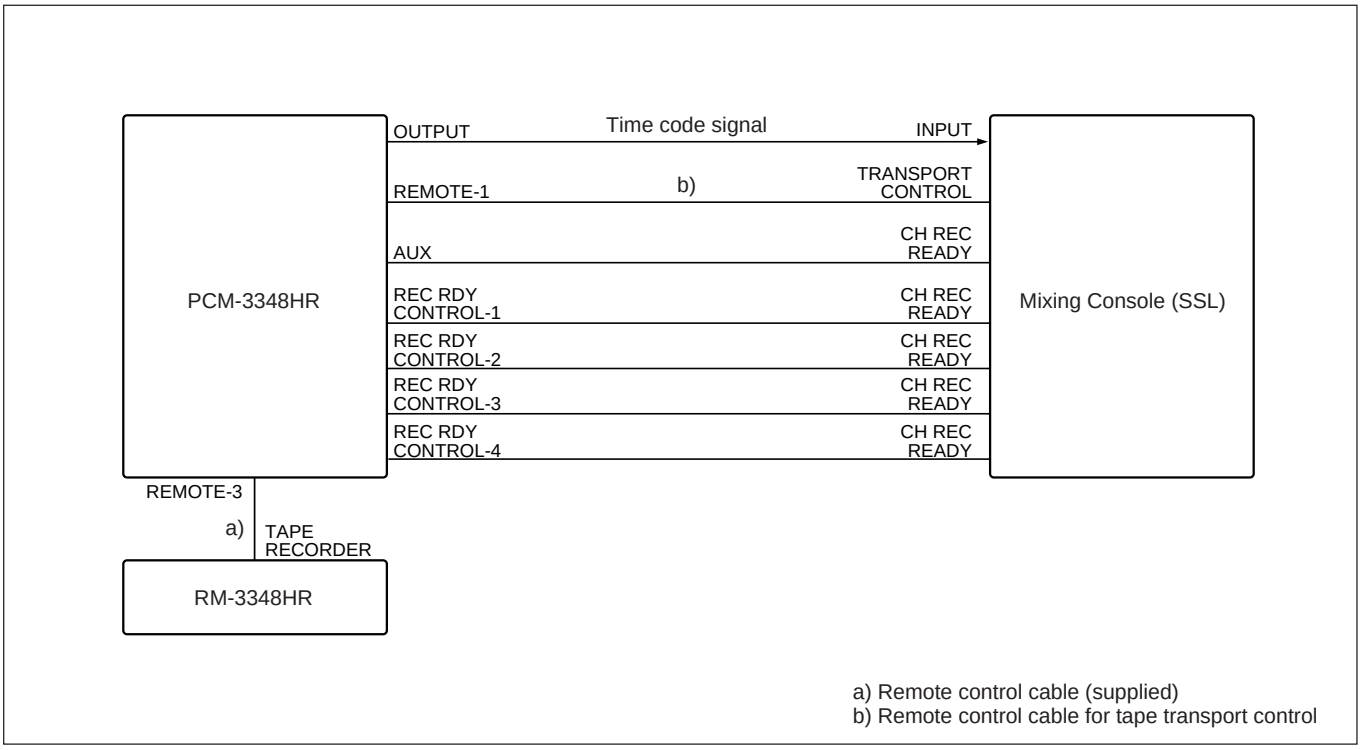
Notes on operation

- When recording on a blank tape, use advance recording.
- For recording on a prestriped tape or for dubbing over an existing recording, use insert recording.
- Use the RM-3348HR for REC READY, SAFE, REPRO and INPUT channel control.

11-3-5 Mixing Automation System (With Tape Remote Function and Recording Ready Control Function)

This is a mixing automation system, using a mixing console such as an SSL system with a tape remote function and recording ready control function.
You can use either the mixing console or the RM-3348HR for controlling the PCM-3348HR.

System configuration



Mixing automation system (with tape remote function and recording ready control function)

Switch settings

The settings on the PCM-3348HR are the same as those in "11-3-4 Mixing Automation System (With Tape Remote Function)," and the settings on the RM-3348HR are the same as those in "11-3-3 Mixing Automation System (No Tape Remote Function)."
For details, see pages 11-13 and 11-14.

Notes on operation

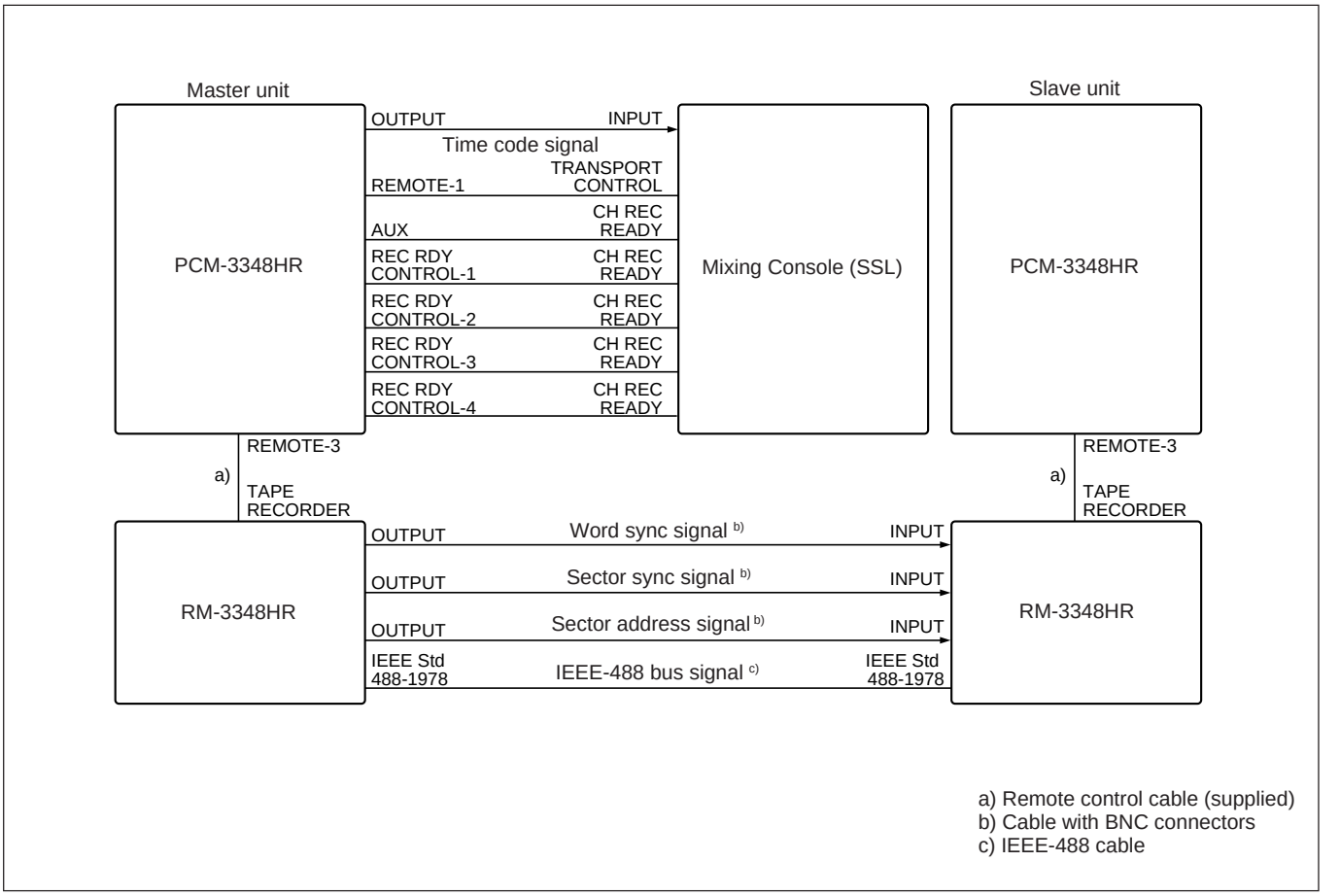
- When recording on a blank tape, use advance recording.
- For recording on a prestriped tape or for dubbing over an existing recording, use insert recording.

11-3 Example System Configurations

11-3-6 Sector-Based Synchronized Operation of Two PCM-3348HR Units Combined with a Mixing Automation System (With Tape Remote Function and Recording Ready Control Function)

This configuration combines a mixing automation system with tape remote function and recording ready control function with two PCM-3348HR units. It uses sector-based synchronization for the PCM-3348HR units.

System configuration



Sector-based synchronized operation of two PCM-3348HR units combined with a mixing automation system

Switch settings

PCM-3348HR settings

Switch	Master unit	Slave unit
REC MODE	INSERT	INSERT
SYNC CLOCK	INT	Set automatically
Fs	Set automatically	Set the same as the master unit
TIME CODE selection	REGENE (EXT)	—
TIME CODE GEN format selection	Format used	—

RM-3348HR settings

Switch	Master unit	Slave unit
SELECTOR switch No.2 (lower)	ON (MASTER)	OFF (SLAVE)
SELECTOR switch No.4 to 8 (lower)	No.4: OFF No.5: OFF No.6: OFF No.7: OFF No.8: OFF Device address: 00H	No.4: OFF No.5: OFF No.6: OFF No.7: OFF No.8: ON Device address: 01H
SLAVE button	OFF	ON
Timer display mode	CTL ABSOLUTE or CTL RELATIVE	CTL ABSOLUTE or CTL RELATIVE

Notes on operation

- Use cables with BNC connectors to connect the word sync, sector sync and sector address signals.
- The two PCM-3348HR units must have the same sampling frequency.
- Use a prestriped tape and carry out insert recording.
- The tape on the slave unit must be prestriped with the same sampling frequency as the master unit.
- You can control the recording ready state of the channels of the master unit from the mixing console.

11-3 Example System Configurations

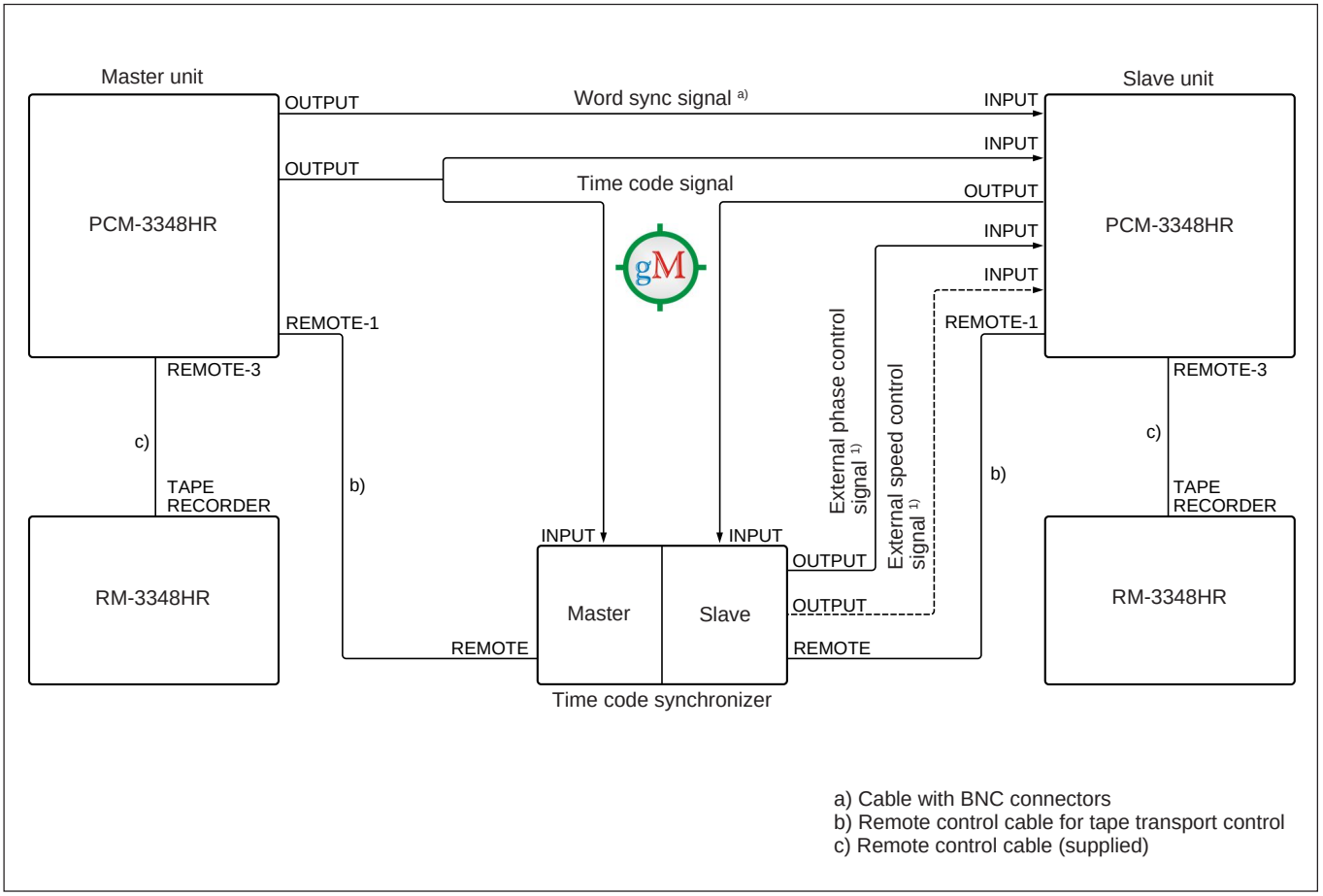
11-3-7 Time Code Synchronization of Two PCM-3348HR Units

This system uses two PCM-3348HR units with a time code synchronizer for synchronization. To increase the stability of the synchronization, a word sync signal is sent from the master unit to the slave unit.

Note

When using the word sync signal for synchronization, the master and slave units must have the same sampling frequency.

System configuration



Time code based synchronization of two PCM-3348HR units

1) Some synchronizers, such as the Timeline Lynx, use two signals, an external phase control signal and an external speed control signal, to synchronize the slave PCM-3348HR.

Switch settings

PCM-3348HR settings

Switch	Master unit	Slave unit
REC MODE	INSERT	INSERT
SYNC CLOCK	INT	EXT
Fs	Set automatically	Same as master
Timer display mode	TIME CODE	TIME CODE
TIME CODE selection	INT	EXT
TIME CODE GEN format selection	Format being used	Format being used
TC GEN (MC board)	REC RUN	—

Notes on operation

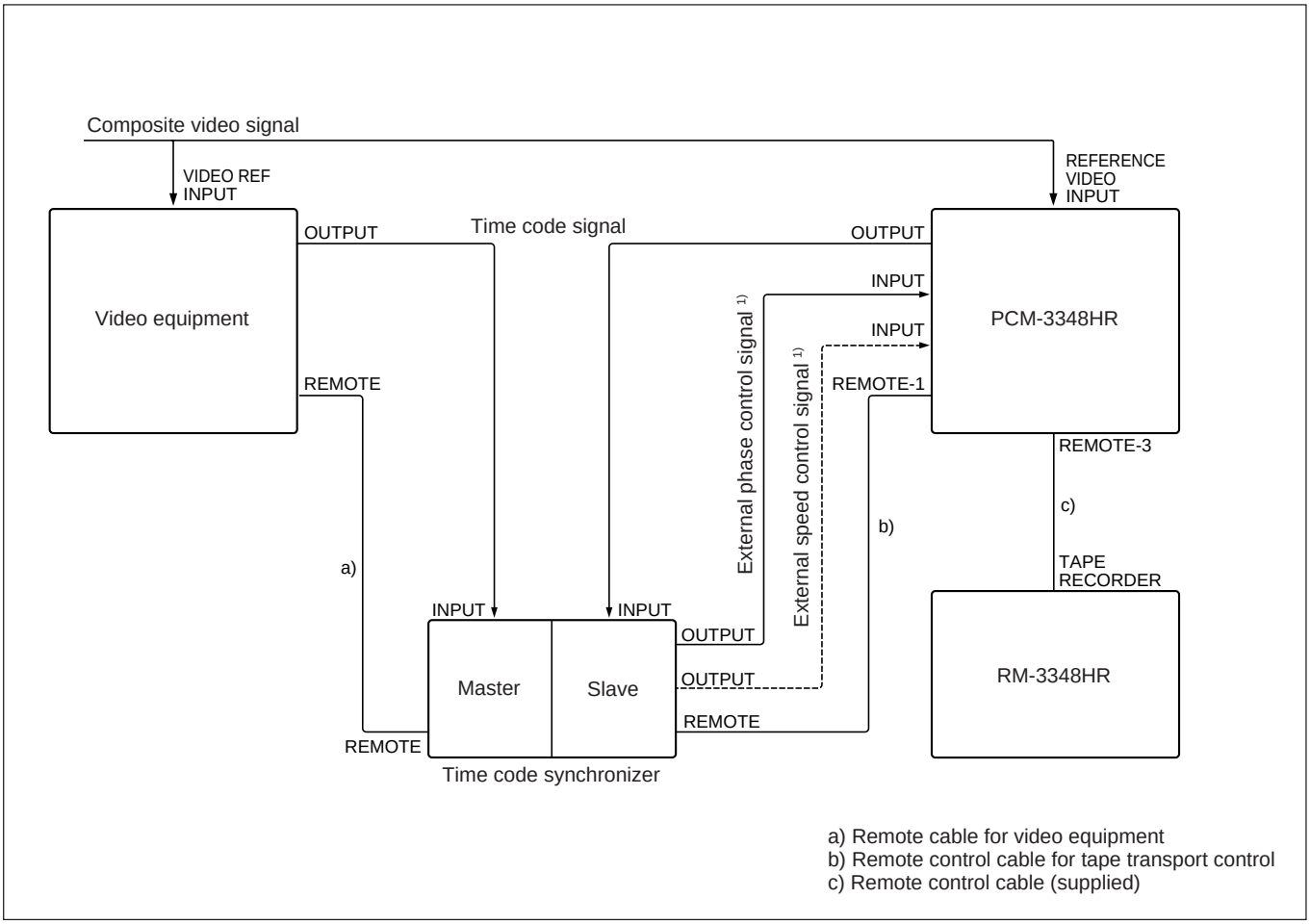
- The synchronizer carries out phase synchronization based on the time code from the master PCM-3348HR. During phase synchronization, the tape transport of the slave unit is controlled by the external phase control signal.
- If you set the SYNC CLOCK switch to EXT, you cannot use the vari-sync function.
- For recording on a prestriped tape or for dubbing over an existing recording, use insert recording.
- Use the RM-3348HR for channel recording ready control; use the synchronizer for punch in/out operations.
  For details of rehearsal control using a synchronizer, see "11-1-3 Rehearsal Control Using a Synchronizer" (page 11-4)
- When recording on a blank tape, use advance recording. In this case, also record the time code simultaneously.

11-3 Example System Configurations

11-3-8 Using a Time Code Synchronizer for Synchronized Operation with Video Equipment

This configuration uses a time code synchronizer for synchronized operation of the PCM-3348HR with video equipment. You can use 44.056 kHz, 44.1 kHz, or 48.0 kHz as the sampling frequency.

System configuration



Using a time code synchronizer for synchronized operation with video equipment

1) Some synchronizers, such as the Timeline Lynx, use two signals, an external phase control signal and an external speed control signal to synchronize the slave PCM-3348HR.

Switch settings

PCM-3348HR settings

Switch	Setting
REC MODE	INSERT
SYNC CLOCK	VIDEO
REFERENCE VIDEO INPUT 75Ω	When terminated: ON For loop-through output: OFF
TIME CODE selection	INT
TIME CODE GEN format selection	Format being used

Video equipment settings

[illegible] remote

[illegible] external synchronization

Notes on operation

- The PCM-3348HR, the video equipment, and the time code synchronizer are all synchronized to a composite video signal.
- The synchronizer carries out phase synchronization based on the time code from the master unit. During phase synchronization, the tape transport of the slave unit is controlled by the external phase control signal.
- Use the RM-3348HR for channel recording ready control; use the synchronizer for punch in/out operations.

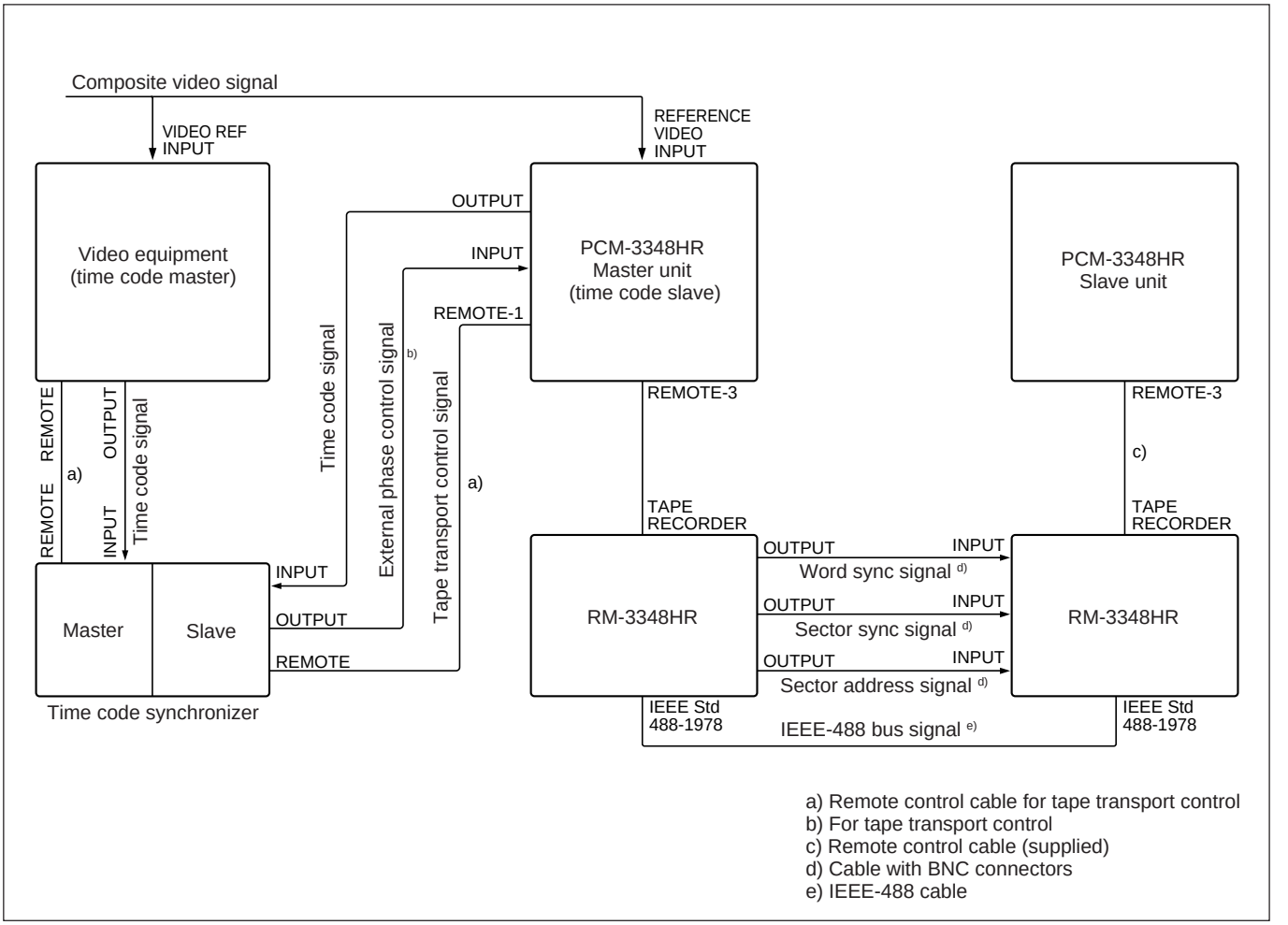
For details of rehearsal control using a synchronizer, see "11-1-3 Rehearsal Control Using a Synchronizer" (page 11-4)

11-3 Example System Configurations

11-3-9 Sector-Based Synchronized Operation of Two PCM-3348HR Units Combined with Synchronized Operation with Video Equipment

This configuration uses sector-based synchronization for the PCM-3348HR units. It allows you to expand a 48 channel video synchronization system to 96 channels.

System configuration



Sector-based synchronized operation of two PCM-3348HR units combined with synchronized operation with video equipment

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Switch settings

PCM-3348HR settings

Switch	Master unit	Slave unit
REC MODE	INSERT	INSERT
SYNC CLOCK	VIDEO	Set automatically
Fs	Set automatically	Set the same as the master unit
REFERENCE VIDEO INPUT 75Ω	When terminated: ON For loop-through output: OFF	—
TIME CODE selection	EXT	—
TIME CODE GEN format selection	Format being used	—

RM-3348HR settings

Switch	Master unit	Slave unit
SELECTOR switch No.2 (lower)	ON (MASTER)	OFF (SLAVE)
SELECTOR switch No.4 to 8 (lower)	No.4: OFF No.5: OFF No.6: OFF No.7: OFF No.8: OFF Device address: 00H	No.4: OFF No.5: OFF No.6: OFF No.7: OFF No.8: ON Device address: 01H
SLAVE button	OFF	ON
Timer display mode	CTL ABSOLUTE or CTL RELATIVE	CTL ABSOLUTE or CTL RELATIVE

Notes on operation

- The master PCM-3348HR, the video equipment, and the time code synchronizer are all synchronized to a composite video signal.
- The slave PCM-3348HR is synchronized to the master unit by the word sync signal. The two PCM-3348HR units must therefore have the same sampling frequency.
- Use cables with BNC connectors to connect the word sync, sector sync and sector address signals.
- By setting the VARI SYNC switch on the MC board of the master PCM-3348HR unit to ON, you can use the variable speed playback function to control the tape transport on both the master and slave units.
- Use a prestriped tape and carry out insert recording.
- The tape on the slave unit must be prestriped with the same sampling frequency as the master unit.

11-3-10 Edit System Using an Editing Control Unit

This system uses a BVE-9100/9000/2000/910 Editing Control Unit for carrying out assemble editing, insert editing, and fast edit.

The editing accuracy is as follows:

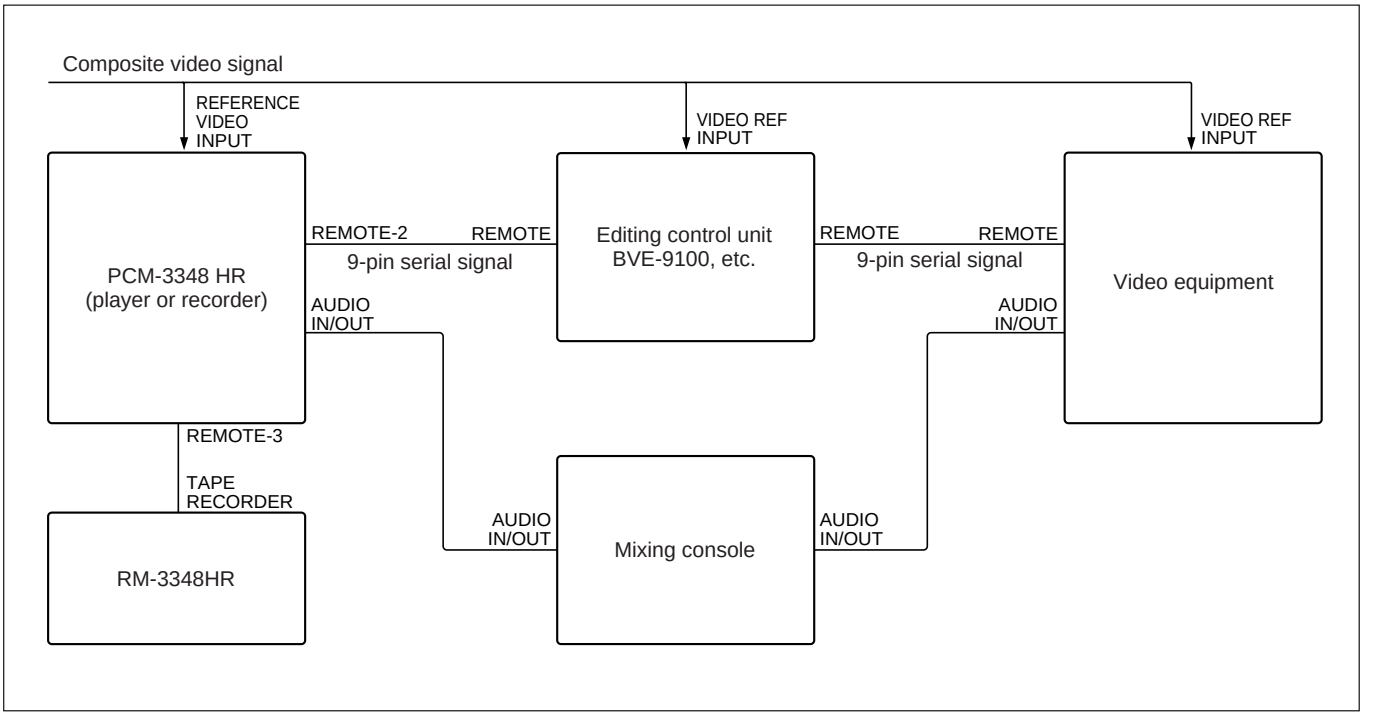
[illegible] ±1frame

[illegible] 0frame

Note on operation

To carry out fast edit, use a blank tape.

Controlling channels from the RM-3348HR in analog-base editing



Controlling channels from the RM-3348HR in analog-base editing

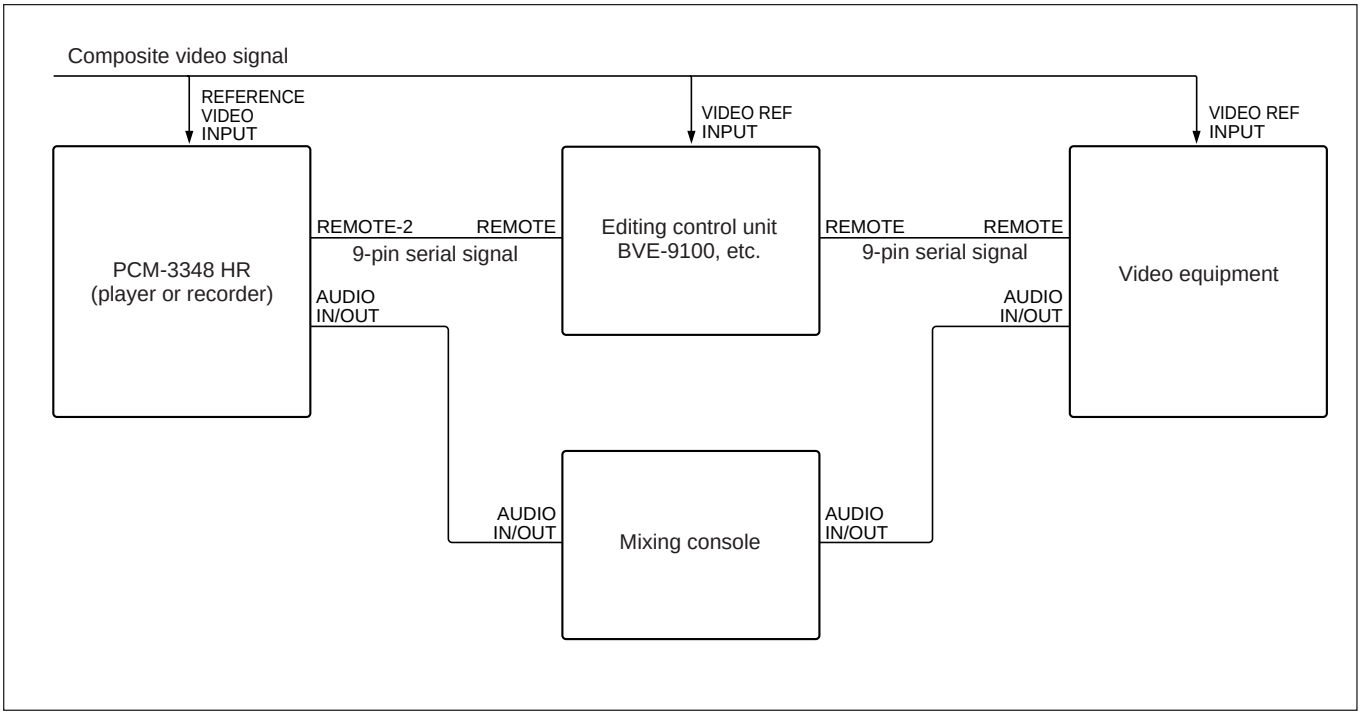
PCM-3348HR Settings

Switch	Setting
SYNC CLOCK	VIDEO
INPUT SELECT	ANALOG
Fs	Set automatically
TIMER MODE	TIME CODE
TIME CODE GEN format selection	Format used
TC GEN on MC board	FREE RUN
SELECT switches No. 4 on MC board	ON
TC SYNC PLAY on TCR board	ON

RM-3348HR settings

Switch	Setting
TIMER MODE	TIME CODE
SELECTOR switch No.1 (upper)	REMOTE-2
SYSTEM CONTROL	REMOTE-2

Controlling channesl from the editing control unit in analog-base editing



Controlling channesl from the editing control unit in analog-base editing

PCM-3348HR Settings

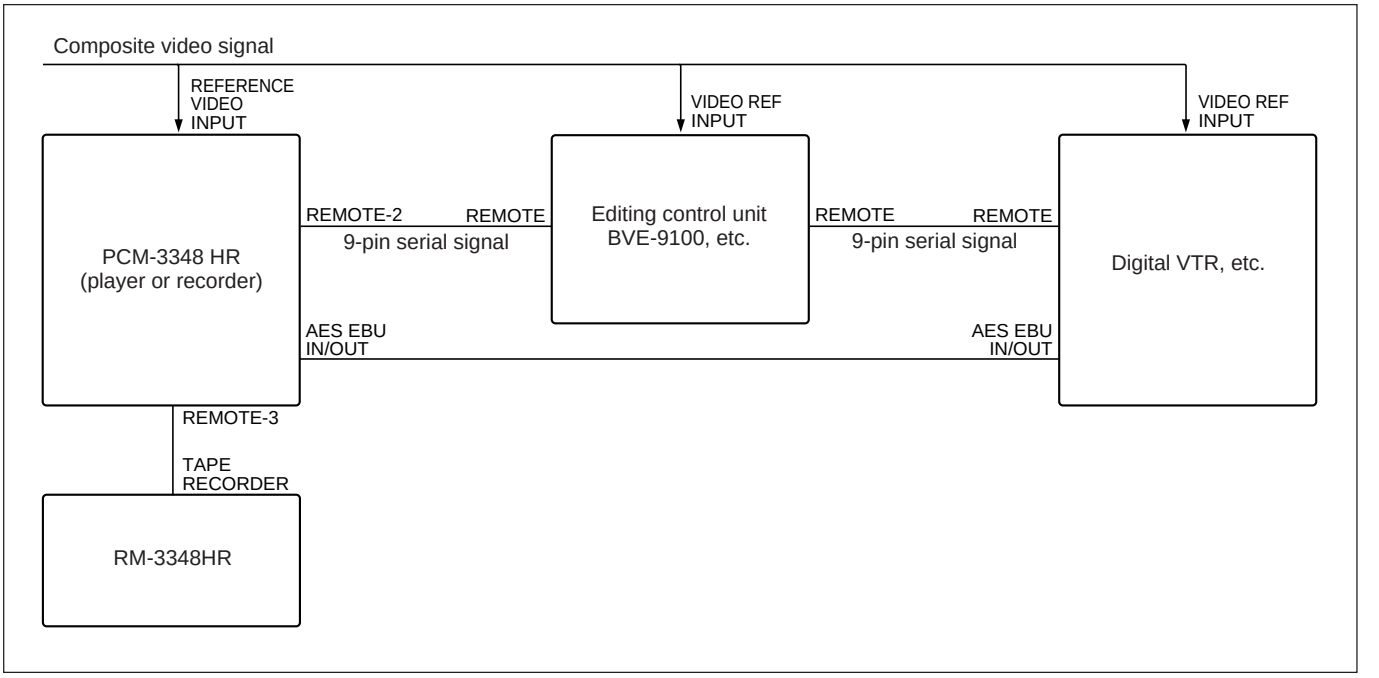
Switch	Setting
SYNC CLOCK	VIDEO
INPUT SELECT	ANALOG
Fs	Set automatically
TIMER MODE	TIME CODE
TIME CODE GEN format selection	Format used
SYSTEM CONTROL	REMOTE-2
TC GEN on MC board	FREE RUN
SELECT switches No. 4 on MC board	ON
TC SYNC PLAY on TCR board	ON

RM-3348HR settings

Switch	Setting
TIMER MODE	TIME CODE
SELECTOR switch No.1 (upper)	NORM
SYSTEM CONTROL	REMOTE-2

11-3 Example System Configurations

Controlling channesl from the RM-3348HR in digital-base editing



Controlling channesl from the RM-3348HR in digital-base editing

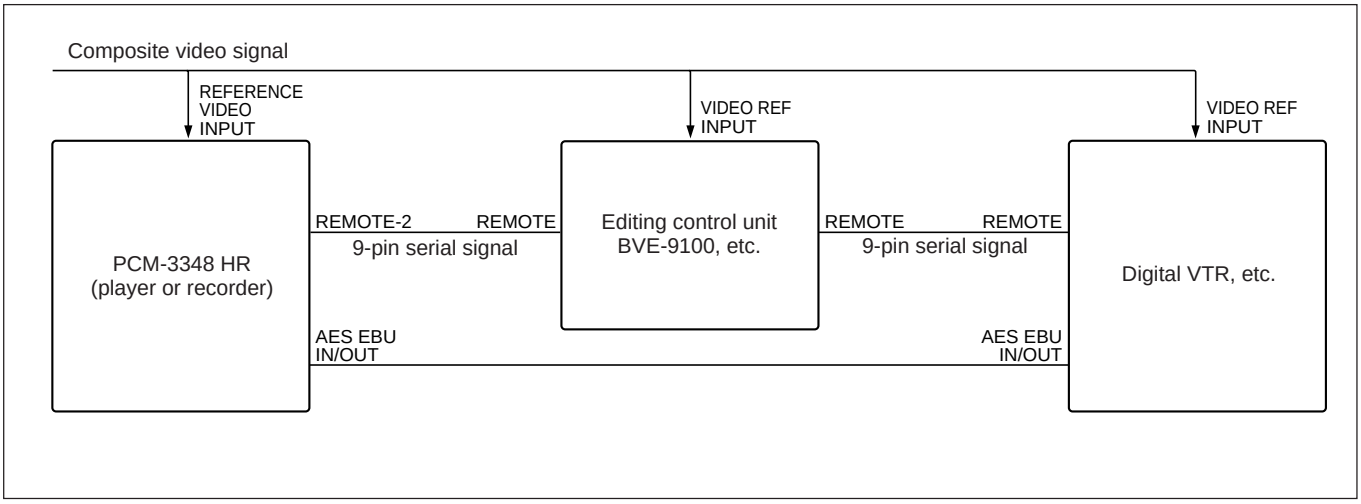
PCM-3348HR Settings

Switch	Setting
SYNC CLOCK	VIDEO
INPUT SELECT	DIGITAL or 2ch DI
Fs	Set automatically
TIMER MODE	TIME CODE
TIME CODE GEN format selection	Format used
TC GEN on MC board	FREE RUN
SELECT switches No. 4 on MC board	OFF
TC SYNC PLAY on TCR board	ON

RM-3348HR settings

Switch	Setting
TIMER MODE	TIME CODE
SELECTOR switch No.1 (upper)	REMOTE-2
SYSTEM CONTROL	REMOTE-2

Controlling channels from the editing control unit in digital-base editing



Controlling channesl from the editing control unit in digital-base editing

PCM-3348HR Settings

Switch	Setting
SYNC CLOCK	VIDEO
INPUT SELECT	DIGITAL or 2ch DI
Fs	Set automatically
TIMER MODE	TIME CODE
TIME CODE GEN format selection	Format used
SYSTEM CONTROL	REMOTE-2
TC GEN on MC board	FREE RUN
SELECT switches No. 4 on MC board	OFF
TC SYNC PLAY on TCR board	ON

RM-3348HR settings

Switch	Setting
TIMER MODE	TIME CODE
SELECTOR switch No.1 (upper)	NORM
SYSTEM CONTROL	REMOTE-2

Setting the VTR constant of the editing control unit

	Machine parameter group															
	Block-1 (CONSTANT-1)								Block-2 (CONSTANT-2)							
	Device type	3	4	5	6	7	8		1	2	3	4	5	6	7	8
PCM-3348HR (NTSC)	60	05	00	96	08	08	06	BF	08	0F	FF	00	00	5A	05	5A
PCM-3348HR (PAL)	61	05	00	7D	08	08	06	BF	08	0F	FF	00	00	5A	05	5A

VTR parameter of the editing control unit

	Machine parameter group							
	Block-4 (VTR CONFIGURATION)							
PCM-3348HR	1	2	3	4	5	6	7	8
(NTSC/PAL)	01	00	88	81	01	7D	00	00

Besides the settings above, the following settins are also necessary.

For digital-base editing and DMC synchronization, set the preroll time of the editing control unit to seven seconds.
Set the speed for DMC synchronization between +88 and +112.

11-3 Example System Configurations

Notes on Operation

- For the DMC control from the editing control unit with the speed setting between +88 and +112, the PCM-3348HR carries out the vari-speed operation. For the speed other than above, the PCM-3348HR carries out the shuttle operation.
- When the PCM-3348HR vari-sync switch is set to OFF, DMC control is disabled.
- When a working tape is replaced, run the tape in play mode to read the time code until the TIME CODE READER lamp lights. Then start editing.
- Once the power of the PCM-3348HR is turned off, wait for more than 10 seconds to turn the unit on again.

12-1 Maintenance

To keep best performance of the unit, daily cleaning and demagnetizing are recommended.

12-1-1 Cleaning

Clean the guide rollers, guide pins, heads, etc. which touch a tape with a head cleaning stick (part number: 3-601-330-00) moistened with cleaning liquid such as alcohol.

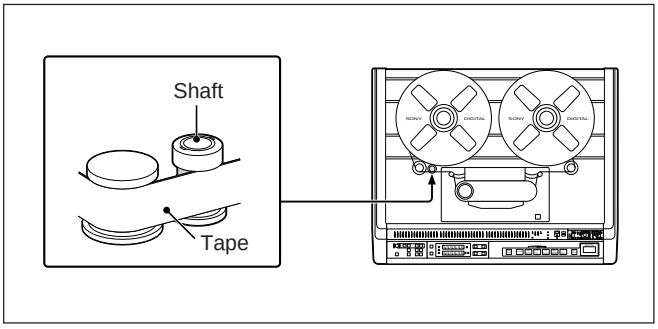
- Remove stains on the guide rollers, tension rollers, shifter rollers, capstan rollers and tape guides in the head block with alcohol, and wipe them with a dry cleaning cloth.
- Wipe each head with a cleaner moistened with alcohol in the same direction as a tape runs, then wipe them with a dry cleaning cloth.

Note

Do not use excessive cleaning liquid on a cleaning stick or cloth or directly apply it to rollers, guides, etc. Be sure to use appropriate amount of cleaning liquid. Daily cleaning can avoid excessive accumulation of oxide.

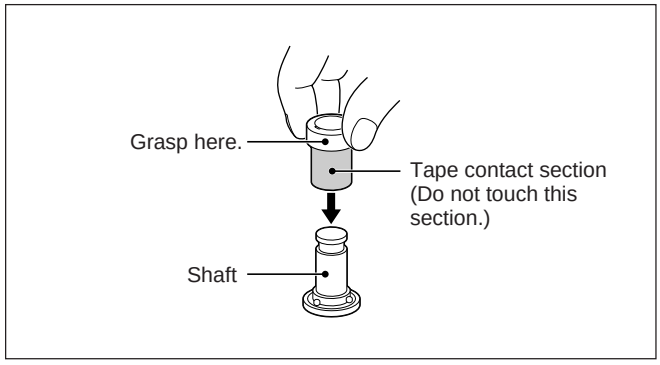
12-1-2 Replacing the Tape Cleaner

The CL-1/2-12 Tape Cleaner is desinged to remove dust and magnetic powder from tapes.



Location of the shaft for installing the tape cleaner.

Replacing the tape cleaner



Instaling the tape cleaner

1 Take out the tape cleaner from the box, taking care not to touch the tape contact section with your fingers.

2 Install the tape cleaner over the shaft, and gently turn to the left or right until it clicks into postion.

3 Load a tape.

When the tape contact section is getting dirty

Turn the tape cleaner until it stops at the next click position. After 10 clicks, the tape cleaner will return to the original click position. Exchange the tape cleaner after one complete 360° rotation. The exchange period under normal usage is about one week.

Note

The tape contact section of the tape cleaner (the green part) is held in place by adhesive tape. There is a danger of the tape being damaged if it comes into contact with this adhesive tape.
Therefore, always ensure that the cleaner is setup correctly before use.

12-1-3 Demagnetizing Heads

1 Place the demagnetizing surface of the demagnetizer to the head as near as possible, and turn the demagnetizer ON.

2 Slowly move the demagnetizer far from the head,. then turn the power OFF.

Demagnetize all of the heads.

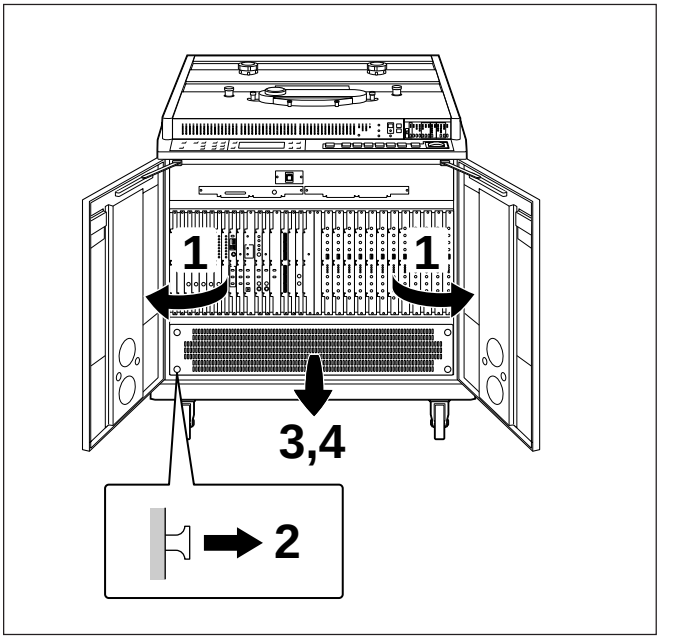
Notes

- When demagnetizing, be sure to turn the PCM-3348HR OFF.
- Never touch the demagnetizer to the heads.

12-1-4 Dust Cover

The dust cover prevents from dust entering inside the PCM-3348HR through ventilation slots. Once the filter on the dust cover cloggs, cooling effects in the PCM-3348HR goes down. Periodically remove the filter and clean it.

Remove the filter as shown below.



1 Open the front door.

2 Pull four plungers on the nylon ratch.

3 Remove the dust cover in the direction of an arrow.

4 Remove the filter.

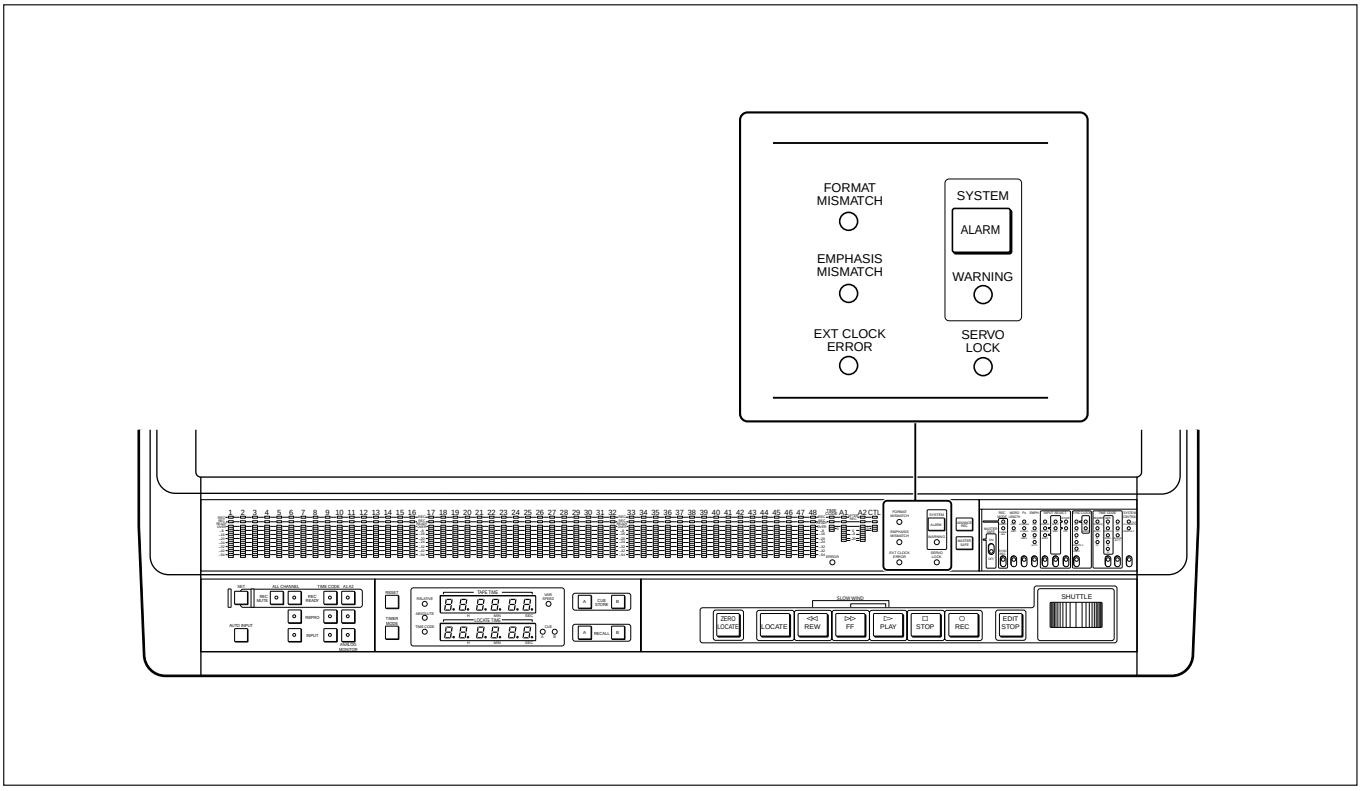
Note

After cleaning the filter with water, dry the filter and mount it to the PCM-3348HR. If the moistened filter is mounted, trouble may occur.

12-2 Warning Lamps

12-2-1 Location of Warning Lamps

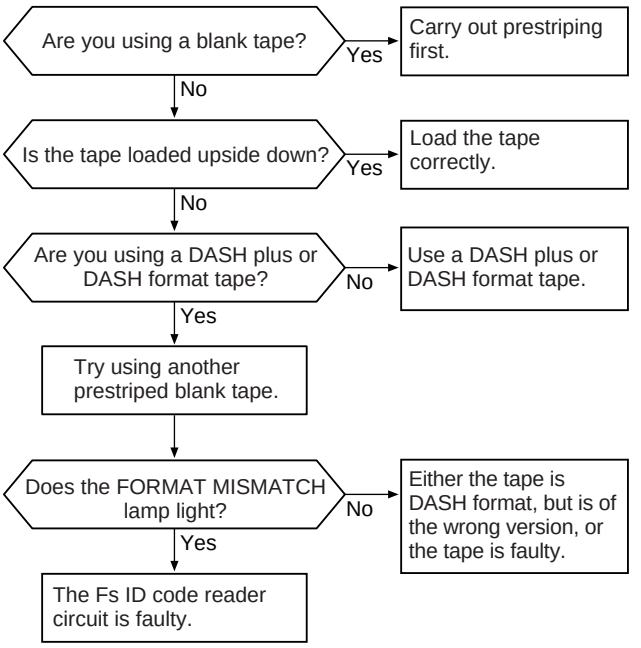
The various warning lamps light to indicate setting errors or operational errors detected.
For details of the TIME CODE ERROR lamp, see “3-7-2 Switches and Lamps Used for Time Code Recording and Playback” (page 3-17).



Location of Warning Lamps

12-2-2 If the FORMAT MISMATCH Lamp Lights Repeatedly

If the FORMAT MISMATCH lamp lights, carry out the following diagnostic procedure.


Are you using a blank tape?
Yes
Carry out prestriping first.
No
Is the tape loaded upside down?
Yes
Load the tape correctly.
No
Are you using a DASH plus or DASH format tape?
No
Use a DASH plus or DASH format tape.
Yes
Try using another prestriped blank tape.
Does the FORMAT MISMATCH lamp light?
No
Either the tape is DASH format, but is of the wrong version, or the tape is faulty.
Yes
The Fs ID code reader circuit is faulty.

12-2-3 If the EMPHASIS MISMATCH Lamp Lights Repeatedly

If the emphasis information recorded on a channel which is in the recording ready state is different from the EMPHASIS switch setting, the EMPHASIS MISMATCH lamp lights. During recording, the emphasis information follows the EMPHASIS switch setting, and therefore care is needed when recording repeatedly on a tape being used for playback. If you continue recording while the EMPHASIS MISMATCH lamp is lit, the recording will be carried out with different emphasis settings from those recorded on the tape.

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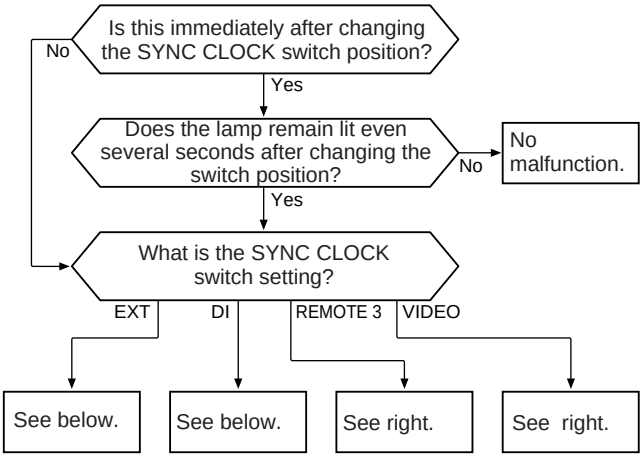
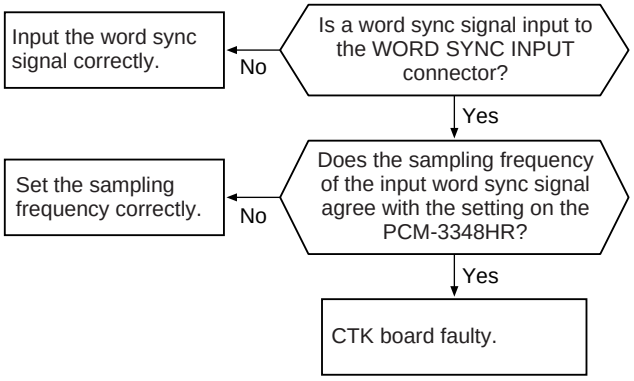
12-2-4 If the EXT CLOCK ERROR Lamp Lights Repeatedly

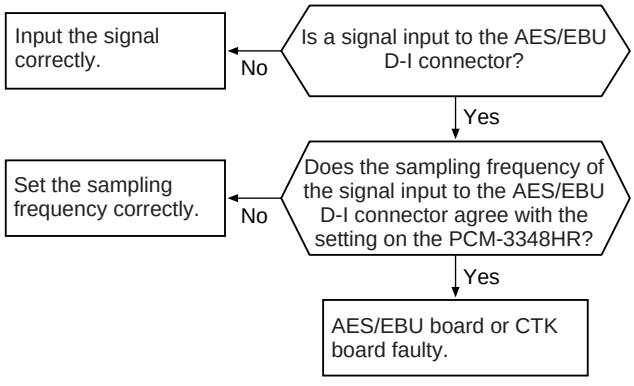
If the EXT CLOCK ERROR lamp lights, carry out the following diagnostic procedure.



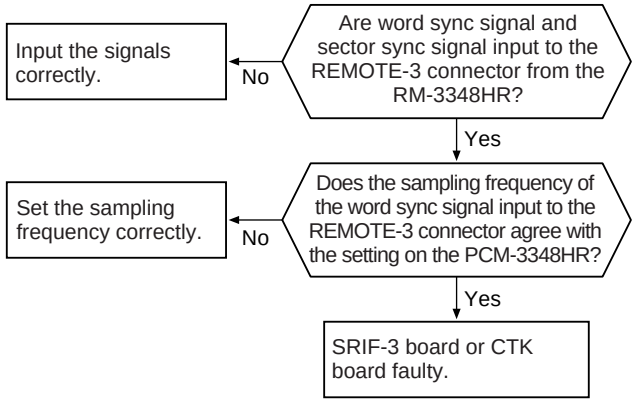
Checks when the SYNC CLOCK switch is set to EXT


Input the word sync signal correctly.
No
Is a word sync signal input to the WORD SYNC INPUT connector?
Yes
Set the sampling frequency correctly.
No
Does the sampling frequency of the input word sync signal agree with the setting on the PCM-3348HR?
Yes
CTK board faulty.

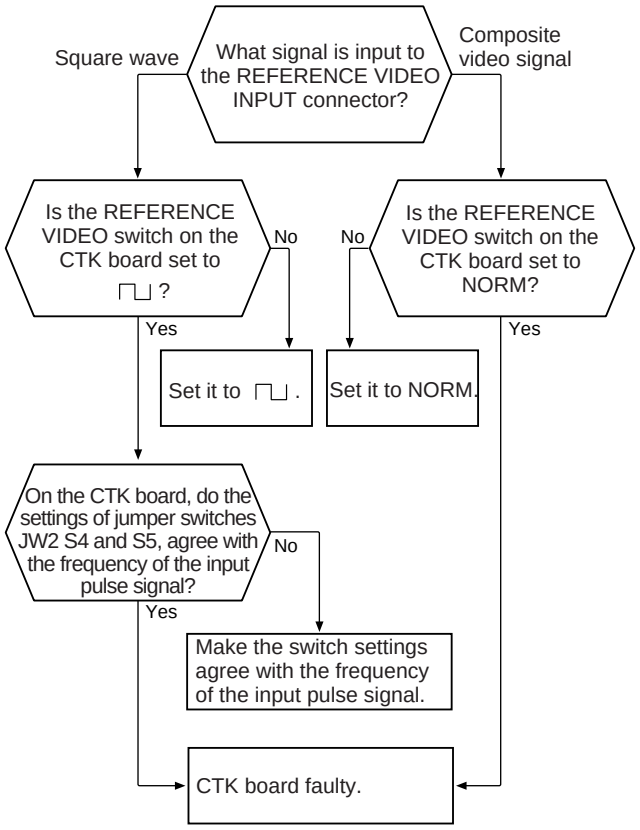
Checks when the SYNC CLOCK switch is set to DI


Input the signal correctly.
No
Is a signal input to the AES/EBU D-I connector?
Yes
Set the sampling frequency correctly.
No
Does the sampling frequency of the signal input to the AES/EBU D-I connector agree with the setting on the PCM-3348HR?
Yes
AES/EBU board or CTK board faulty.

Checks when the SYNC CLOCK switch is set to REMOTE 3


Input the signals correctly.
No
Are word sync signal and sector sync signal input to the REMOTE-3 connector from the RM-3348HR?
Yes
Set the sampling frequency correctly.
No
Does the sampling frequency of the word sync signal input to the REMOTE-3 connector agree with the setting on the PCM-3348HR?
Yes
SRIF-3 board or CTK board faulty.

Checks when the SYNC CLOCK switch is set to VIDEO


Square wave
What signal is input to the REFERENCE VIDEO INPUT connector?
Composite video signal
Is the REFERENCE VIDEO switch on the CTK board set to ⊓⊔ ?
No
Yes
Set it to ⊓⊔ .
Is the REFERENCE VIDEO switch on the CTK board set to NORM?
No
Yes
Set it to NORM.
On the CTK board, do the settings of jumper switches JW2 S4 and S5, agree with the frequency of the input pulse signal?
No
Yes
Make the switch settings agree with the frequency of the input pulse signal.
CTK board faulty.

12-2-5 If the SYSTEM WARNING Lamp Lights

If you make particular settings, this lamp may light. If it does light, check that the settings are correct. It is, however, possible to continue operation while this lamp is on. If SELECT switch No. 3 on the MC board is set to ON, while this lamp is lit, the tape time display also shows a warning code.

Warning codes and meanings

Warning code	Meaning	Notes
InF 01	The analog audio channel automatic recording mode isselected. (SELECT switchNo.2 on the MC board set to ON)	See ”Automatic recording of analog audio channels” (page 3-14).
InF 02	CTL protect mode is not selected.(CTL PRO jumper on the MC board set to the right)	Normally, select CTL protect mode. See “CTL protect mode”(page 3-8).
InF 03	Fs shift mode is selected. (FS SHIFT switch on the CTK board set to ON)	See “Sampling frequency for prestriping or advance recording” (page 2-9).
InF 04	An external word clock error has occurred.	See “12-2-4 If the EXT CLOCK ERROR Lamp lights repeatedly” (page 12-5).
InF 05	Forced assemble recording mode is selected. (ASM jumper on the MC board set to the right)	See “3-5-1 What Is Assemble Recording?” (page 3-10).
InF 06	The heads are set to be in contact with the tape during fast forward and rewind. (HEAD jumper on the MC board set to the right)	See “MC board” (page A-20).
InF 07	EDIT test mode is selected. (Test switches on the ED-2 board set to TEST)	See “ED-2 board” (page A-25).
InF 09	When copying the CTL signal during a backup copy operation, the external sector address signal format is wrong.	

12-2-6 If the SYSTEM ALARM Lamp Lights

On the PCM-3348HR

This lamp lights if there is a fault in the system.
If this lamp lights, note the error code shown in the tape time display, turn off the power, and consult your Sony service representative.

Error codes and meanings

Error code	Meaning
E.01-01	POWER STATUS error. At least one of the power supplies except the VARI power does not start up.
E.01-02	+12 V supply has failed.
E.01-03	–12 V supply has failed.
E.02-02	D BUS error
E.02-03	A BUS error
E.02-04	RAM check error
E.02-05	ROM check error
E.02-06	AUPC71059 interrupt controller write/read check error
E.02-07	AUPC71059 interrupt controller write/read check error
E.02-08	ATMP82C79 keyboard/display controller write/read check error
E.02-09	WAIT control circuit error
E.02-10	TCG EXT ROUTE error
E.02-11	TCG PB ROUTE error
E.02-12	PB DELAY, REC DELAY error
E.02-13	EEPROM read/write check error
E.03-02	TCR loop test, PB FORMAT error
E.03-03	TCR loop test, EXT FORMAT error
E.03-04	TCR loop test, PB STATUS error
E.03-05	TCR loop test, EXT STATUS error
E.03-06	PB REGEN test error
E.04-01	CTK board not installed.
E.04-02	INTERNAL WORD cycle check error
E.04-03	INTERNAL SECTOR cycle check error
E.04-04	REC counter or ISA or ESA data check error
E.04-05	DECODE DELAY check error
E.04-06	ENCODE DELAY check error
E.04-07	DEC RANGE check error
E.04-08	SPEED check error
E.04-09	INTERNAL X’tal WORD error
E.04-10	INTERNAL X’tal SECTOR error

Error code	Meaning
E.04-12	TIMER ROLLER check error
E.04-13	LOCK MODE read error
E.04-14	AUTO ASSEMBLE error. AUTO ASSEMBLE operation is not normally completed.
E.05-01	ARP board not installed.
E.05-02	ARP self-diagnosis error (A1)
E.05-03	ARP self-diagnosis error (A2)
E.05-04	ARP PB LEVEL parameter error
E.06-02	MEM self-diagnosis loop test error
E.06-03	Communications error between MEM and MC boards.
E.07-01	EDIT board not installed.
E.07-02	EDIT RAM test error
E.07-03	EDIT ADA loop test error
E.07-04	PB MUTE test error
E.07-05	REC MUTE test error
E.07-06	EDIT ADA emphasis error
E.07-09	Signal processing loop error
E.07-10	Signal processing emphasis flag error
E.07-11	MONITOR MUTE error
E.07-12	REC STOP READY timeout error
E.07-13	LIMIT TOP WAIT timeout error
E.07-14	REC ON MONITOR error
E.07-16	Self-diagnosis not possible with ED board test switch on.
E.08-02	SERVO power supply error
E.08-03	Tension regulation error
E.08-04	Reel error
E.08-05	Capstan error
E.08-06	SHIFTER/SHUTTLE error
E.08-07	Tension error. The tension value is extraordinarily high or low.
E.08-08	Tape speed error. The tape speed is extraordinarily fast.
E.08-09	Reel diameter fault. The detected reel diameter is not normal.
E.08-10	Drive voltage fault.
E.08-11	Communications error with capstan.
E.08-12	Communications error with MC board.
E.08-13	Loading error

Error code	Meaning
E.08-14	Unload complete timeout error
E.08-15	Servo parameter error
E.09-02	DET STATUS error
E.09-03	REC STATUS error
E.09-04	DET-to-MC communications error
E.09-05	AD GAIN (SYNC HEAD) error (including coefficient error in EEPROM)
E.09-06	C1 (SYNC HEAD) error (including coefficient error in EEPROM)
E.09-07	C3 (SYNC HEAD) error (including coefficient error in EEPROM)
E.09-08	AD GAIN (MONITOR PB HEAD) error (including coefficient error in EEPROM)
E.09-09	C1 (MONITOR PB HEAD) error (including coefficient error in EEPROM)
E.09-10	C3 (MONITOR PB HEAD) error (including coefficient error in EEPROM)
E.09-11	REC coefficient error (including coefficient error in EEPROM)
E.09-12	ERASE coefficient error (including coefficient error in EEPROM)
E.09-15	DET error. ALARM ATN is received from DET CPU.
E.09-16	NACK return from DET in MC-to-DET communication.
E.10-02	REMOTE2 interface self-diagnosis error
E.10-03	REMOTE2-to-MC communication error
E.11-02	Communications RAM write/read check error in REMOTE3 interface self-diagnosis
E.11-03	CRC generation circuit error in REMOTE3 interface self-diagnosis
E.12-02	REMOTE1 interface self-diagnosis error
E.13-02	REMOTE4 interface self-diagnosis error
E.14-02	DIO (MULTI) loop error in self-diagnosis
E.14-03	DIO (MULTI) emphasis flag error in self-diagnosis
E.14-04	2-CH DIO emphasis flag error in self-diagnosis
E.14-05	SDIF-2 2CH-DIO loop error in self-diagnosis
E.14-06	AES/EBU 2CH-DIO loop error in self-diagnosis

On the RM-3348HR

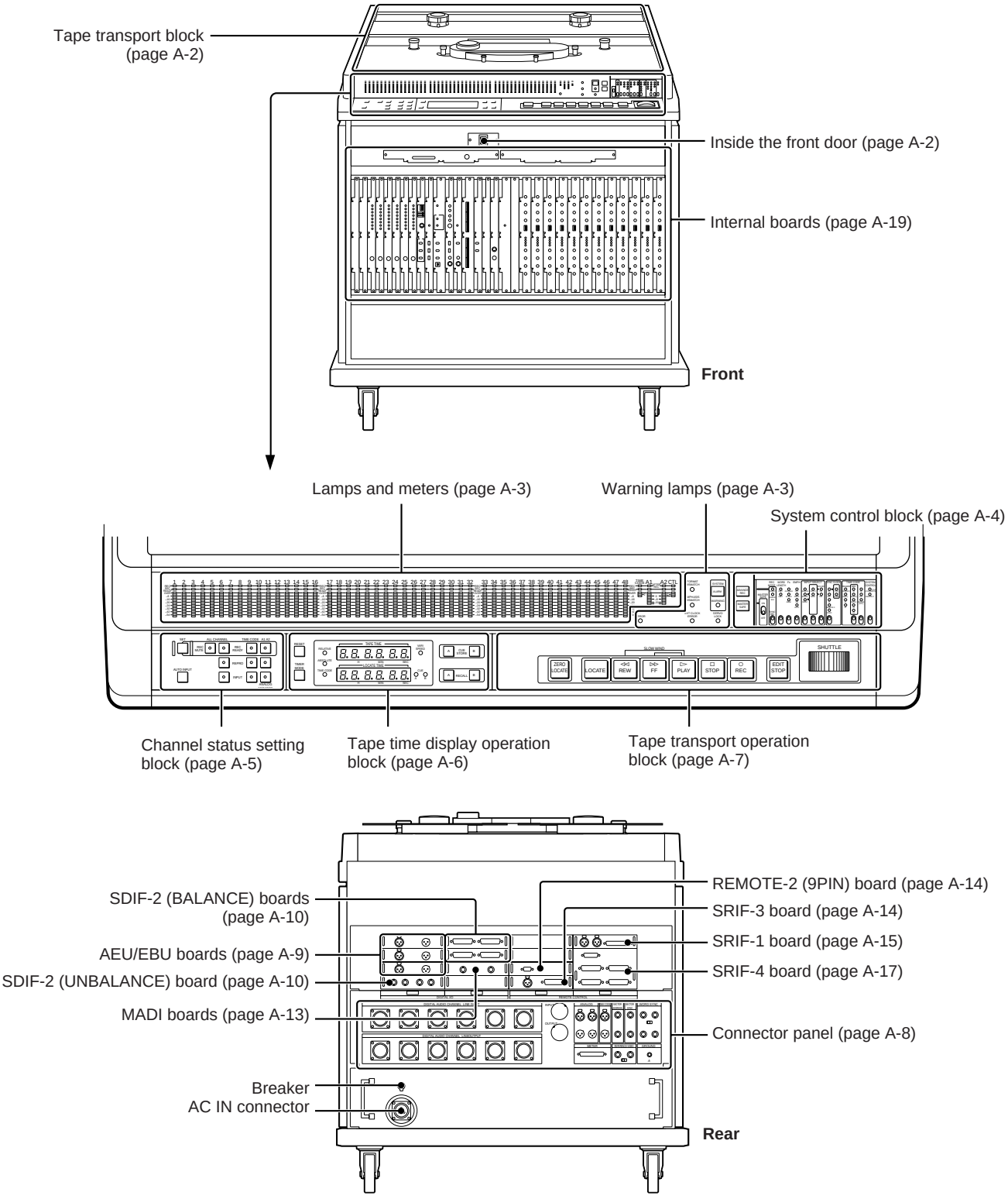
If some error occurs with the RM-3348HR, the SYSTEM ALARM lamp lights and an error code is displayed on the LOCATE TIME display.

Error codes and meanings

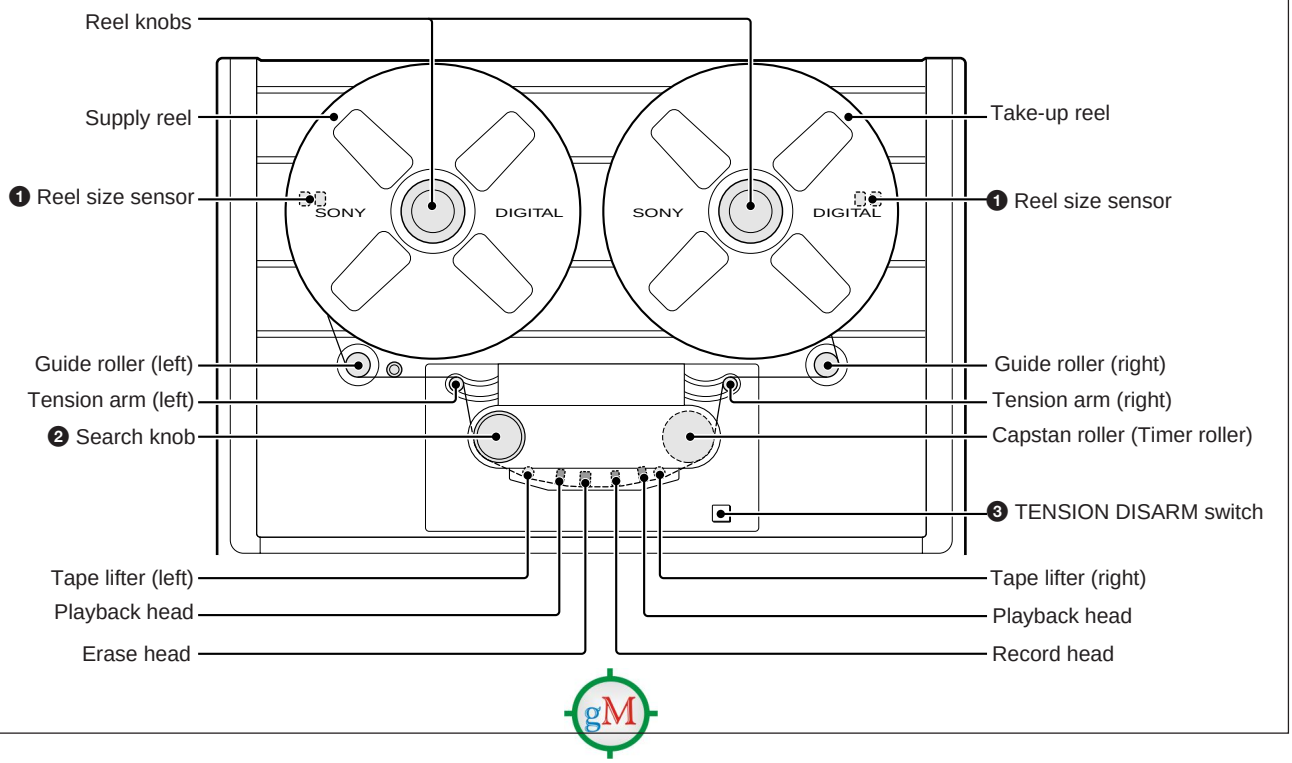
Error code	Meaning
OFL (overflow)	The time display range is exceed.
UFL (underflow)	The lower limit of the time display range is exceed.
ILLG (illegal operation)	Improper operations
- - - - - -	The SECTOR CLK signal does not reach the RM-3348HR.
InF 01	NACK CRC error
InF 02	NACK UNDEFINED error
InF 03	NACK OVERRUN error
InF 04	NACK MEMORY WRITE error
InF 05	NACK MEMORY READ error
InF 06	NACK OPERATION error
InF 11	Command return error
InF 12	Data CRC error
InF 13	Data transfer error
InF 14	Data transfer error
InF 15	Data transfer error
InF 16	Data transfer error
dr_out (drop-out)	No CTL signal on the tape
no in tc (no input time code)	No time code being supplied
no Pb tc (no play-back time code)	No time code is reproduced from the tape.
no oPtion	MEM or TCR board not installed in the PCM-3348HR.

Location and Function of Parts

PCM-3348HR


Tape transport block (page A-2)
Inside the front door (page A-2)
Internal boards (page A-19)
Front
Lamps and meters (page A-3)
Warning lamps (page A-3)
System control block (page A-4)
Channel status setting block (page A-5)
Tape time display operation block (page A-6)
Tape transport operation block (page A-7)
SDIF-2 (BALANCE) boards (page A-10)
AEU/EBU boards (page A-9)
SDIF-2 (UNBALANCE) board (page A-10)
MADI boards (page A-13)
Breaker
AC IN connector
REMOTE-2 (9PIN) board (page A-14)
SRIF-3 board (page A-14)
SRIF-1 board (page A-15)
SRIF-4 board (page A-17)
Connector panel (page A-8)
Rear

Tape transport block



[illegible] 1

Detect 12.5- and 14-inch reels.

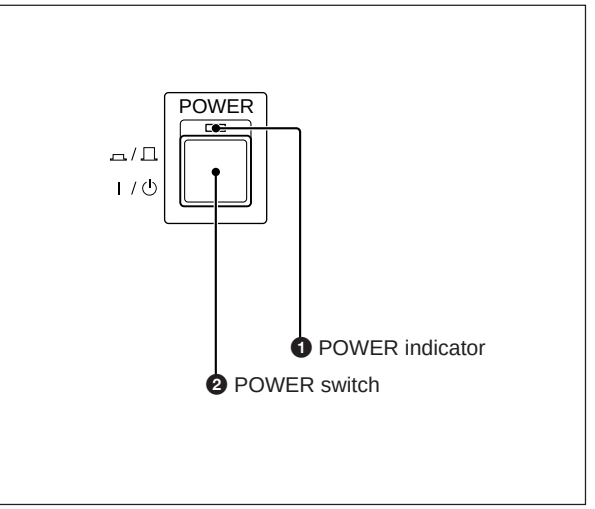
[illegible] 2

Turn to search precisely for the desired edit point on the tape.

[illegible]

Used for tape loading or unloading.

Inside the front doors



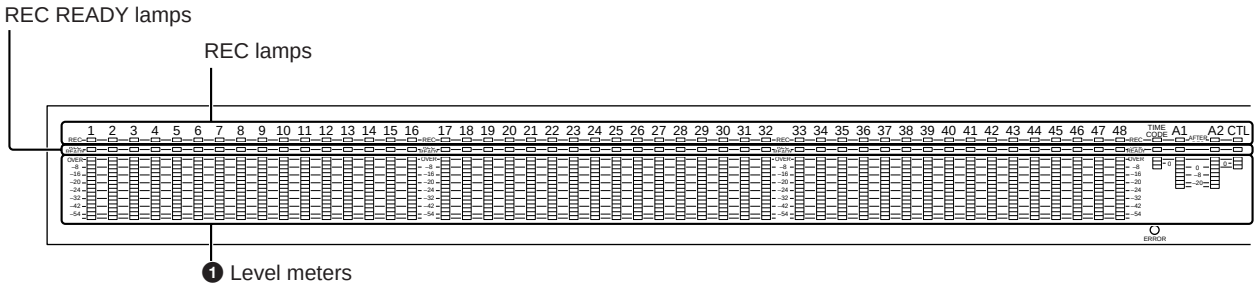
[illegible] 1

Lights up when the POWER switch is set to ON.

[illegible] 2

Turns the control signal for the switching regulator on or off. For normal operation, the circuit breaker on the rear of the unit should be kept at ON, and the unit can be turned on or off with this POWER switch.
To completely shut off the power to the unit, set the breaker to OFF.

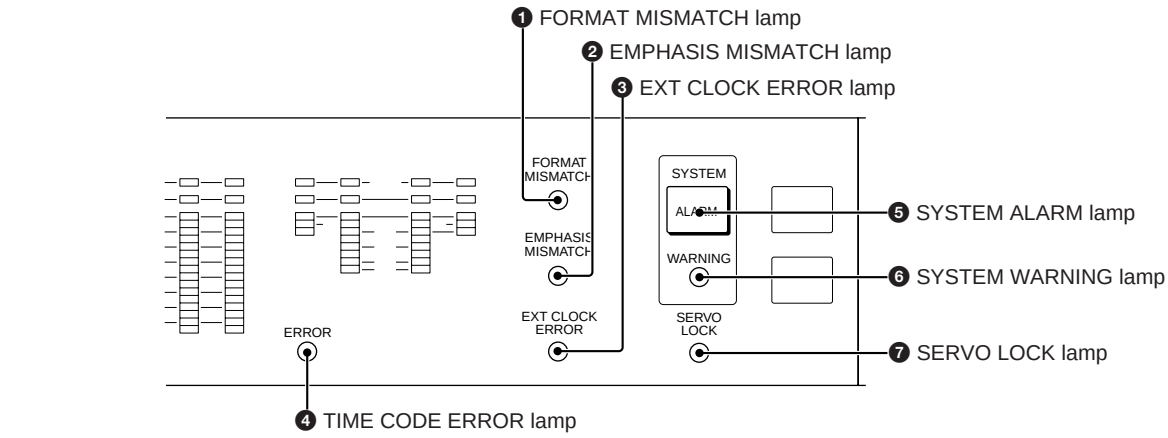
Lamps and meters



❶

The display mode can be selected with the level meter display switch on the MT board.
See "MT board" (page A-26).

Warning lamps



❶

For details on the function of this lamp, see Section 12-2-2, "If the FORMAT MISMATCH Lamp Lights Repeatedly" (page 12-4).

❷

For details on the function of this lamp, see Section 12-2-3, "If the EMPHASIS MISMATCH Lamp Lights Repeatedly" (page 12-4).

❸

For details on the function of this lamp, see Section 12-2-4, "If the EXT CLOCK ERROR Lamp Lights Repeatedly" (page 12-5).

❹

For details on the function of this lamp, see Section 3-7-2, "Switches and Lamps Used for Time Code Recording and Playback" (page 3-17).

❺

For details on the function of this lamp, see Section 12-2-6, "If the SYSTEM ALARM Lamp Lights" (page 12-6).

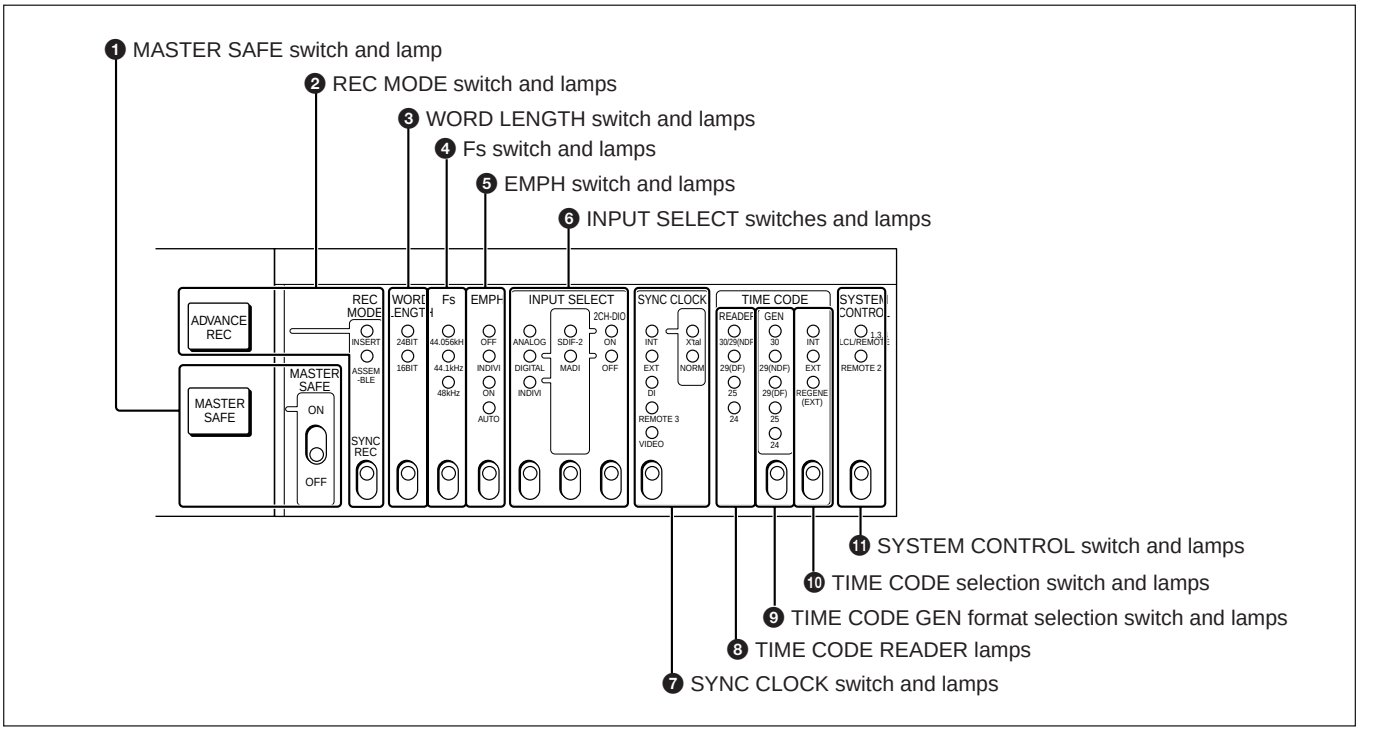
❻

For details on the function of this lamp, see Section 12-2-5, "If the SYSTEM WARNING Lamp Lights" (page 12-6).

❼

This lamp lights when the servo is locked.

System control block



System control block

[illegible]

When this switch is in the ON position, recording is inhibited on all channels.

[illegible]

Select the recording mode from the following settings:

ADVANCE REC: Advance recording mode
INSERT: Insert recording mode
ASSEMBLE: assemble recording mode

[illegible]

Select the word length for recording or playback.

[illegible] 4

Select the sampling frequency.
For details, see Section 2-4-3, "Selecting the Sampling Frequency" (page 2-9).

[illegible]

For details, see Section 2-4-5, "Selecting the Emphasis" (page 2-11).

[illegible]

For details, see Section 2-4-4, "Selecting the Input Signal" (page 2-10).

[illegible]

[illegible] 7

[illegible] 8

[illegible] 9

[illegible] 10

[illegible] 11

For details on the operation of these switches, see Section 3-7-2, "Switches and Lamps Used for Time Code Recording and Playback" (page 3-17).

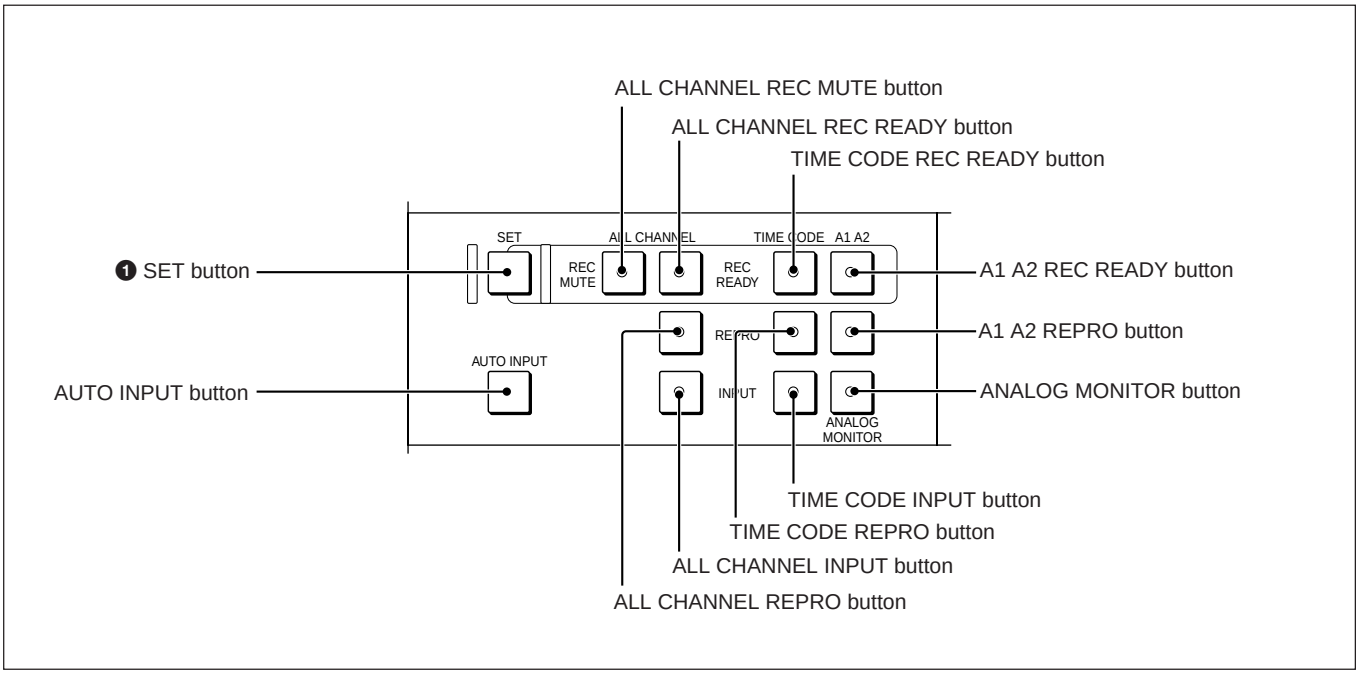
[illegible]

This selects the device used to control the PCM-3348HR.

LCL/REMOTE: PCM-3348HR.
Time code synchronizer connected to the EXT PHASE CONTROL INPUT connector, EXT SPEED CONTROL INPUT connector, or REMOTE-1 connector.
RM-3348HR remote control unit connected to the REMOTE-3 connector.
Mixing console connected to the AUX connector, REC RDY CONTROL 1, 2, 3 or 4 connector.
Video editing control system connected to the REMOTE-2 connector.

REMOTE2: Video editing control system connected to the REMOTE-2 connector

Channel status setting block



Channel status setting block

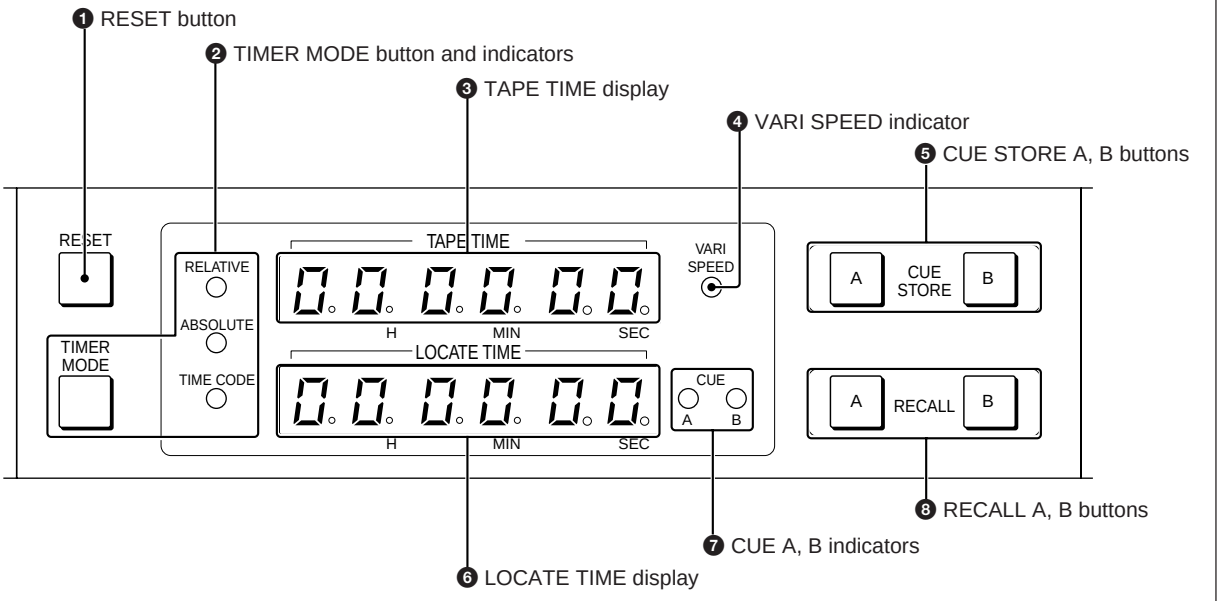
1

To set all digital audio channels, two analog channels, or time code channel to the recording ready state, hold down this button and press the ALL CHANNEL REC READY button, A1 A2 REC READY button, or TIME CODE REC READY button.

For details on the operation of the other buttons, see the following sections:
Section 3-1, "Channel Settings" (page 3-1)
Section 3-4, "Advance Recording" (page 3-6)
Section 3-5-2, "Assemble Recording Operation" (page 3-12)

For analog audio channel (A1 A2) buttons, see Section 3-6-2, "Analog Audio Channel Recording" (page 3-14).
For the time code related buttons, see Section 3-7, "Time Code Channel Recording and Playback" (page 3-16).
For the ALL CHANNEL REC MUTE button, see "Setting all digital audio channels to the muting signal recording state" (page 3-2).
For the AUTO INPUT button, see "Switching the monitor output automatically depending on the tape transport state" (page 3-2).

Tape time display operation block



Tape time display operation block

RESET

Reset the TAPE TIME display to "0."
When this key is pressed in the CTL absolute mode, the TAPE TIME display shows "00 H00MIN00sec" momentarily to indicate that the CTL address generator has been reset to "0," then resumes the previous address display.

TIMER MODE

Selects the display mode of the TAPE TIME and LOCATE TIME indication.

Setting	Display mode
RELATIVE	CTL relative mode
ABSOLUTE	CTL absolute mode
TIME CODE	Time code absolute mode

TAPE

Shows the tape running time and the current tape position.

❹ VARI SPEED (variable speed playback) indicator

Indication	Status of the unit
Flashes	While the tape speed is changing to the designated speed.
Lights up	When the tape speed reaches the designated speed.
Off	When the tape is running at normal speed.

CUE STORE

Press to store the tape position data on the TAPE TIME display as a CUE point. When the A or B button is pressed, the corresponding CUE indicator lights up and the tape position data is stored in the corresponding cue register. The memory backup is not operated for these cue registers.

LOCATE

When CUE STORE A or B is pressed, the address on the TAPE TIME display is transferred here as a cue point. When RECALL A or B is pressed, the cue point address in memory is shown here. When any trouble or malfunction is detected in the unit, this display will show alarm or warning messages.

CUE A, B ❼

Each indicator shows the cue register in which the address on the LOCATE TIME display is stored.

RECALL

Press to display the cue point data stored in the register on the LOCATE TIME display.

For the functions of the RESET button ❶, TIMER MODE button and indicators ❷ and TAPE TIME display ❸, see Section 2-5-2, "Setting the Timer Display Mode."

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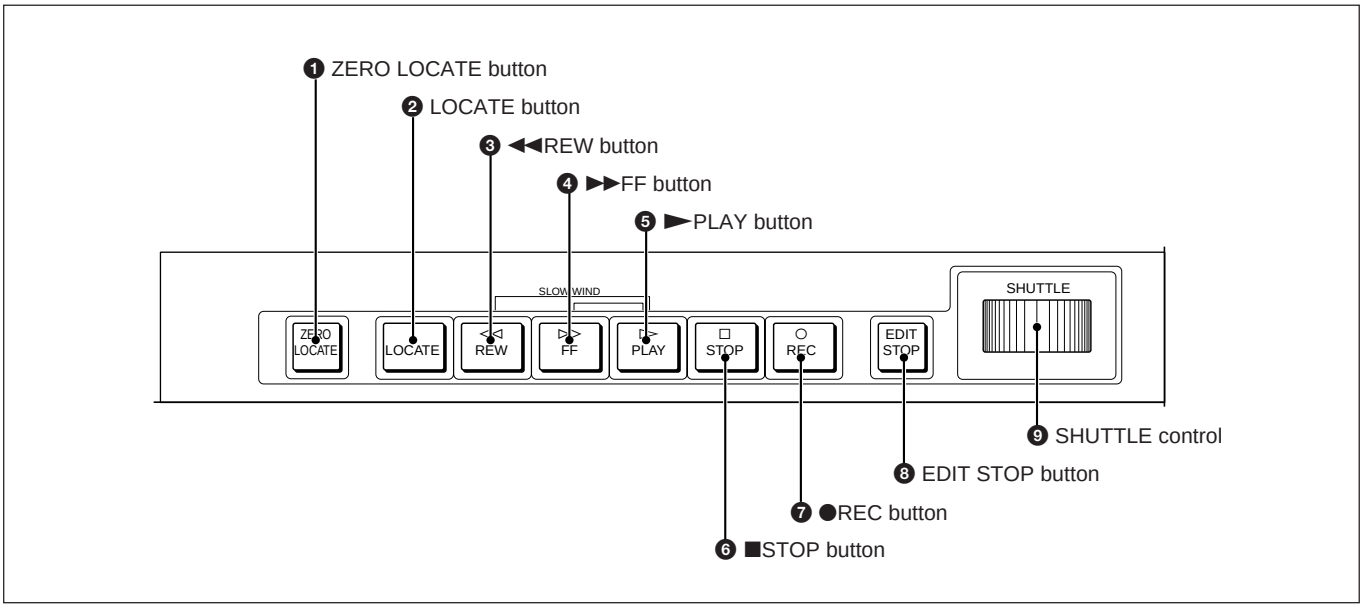
Tape transport operation block



Tape transport operation block

ZERO LOCATE

Used to search for the "0 H00MIN00SEC" point of the current tape time display mode.

LOCATE

Used to search for the cue point displayed on the LOCATE TIME display.

3 ◄◄REW

Rewinds the tape.
When this button is pressed during recording, the recording can be ended with cross-fading. For slower rewinding, press this button simultaneously with the PLAY button, and the tape will be rewound at twice the normal playback speed.

4 ►►FF

Fast-forwards the tape.
When this button is pressed during recording, the recording can be ended with cross-fading. For slower fast-forwarding, press this button simultaneously with the PLAY button, and the tape will be fast-forwarded at twice the normal playback speed.

5 ►PLAY

Plays the tape back.
To start recording, press this button and the REC button simultaneously. When this button is pressed during recording, recording ends with cross-fading.

6 ■STOP

Stops the tape.
When this button is pressed during recording, recording stops. When a tape is unloaded and this button is pressed, the tension arms are activated to load the tape.

7 ●REC

To start recording, press this button and the PLAY button simultaneously.

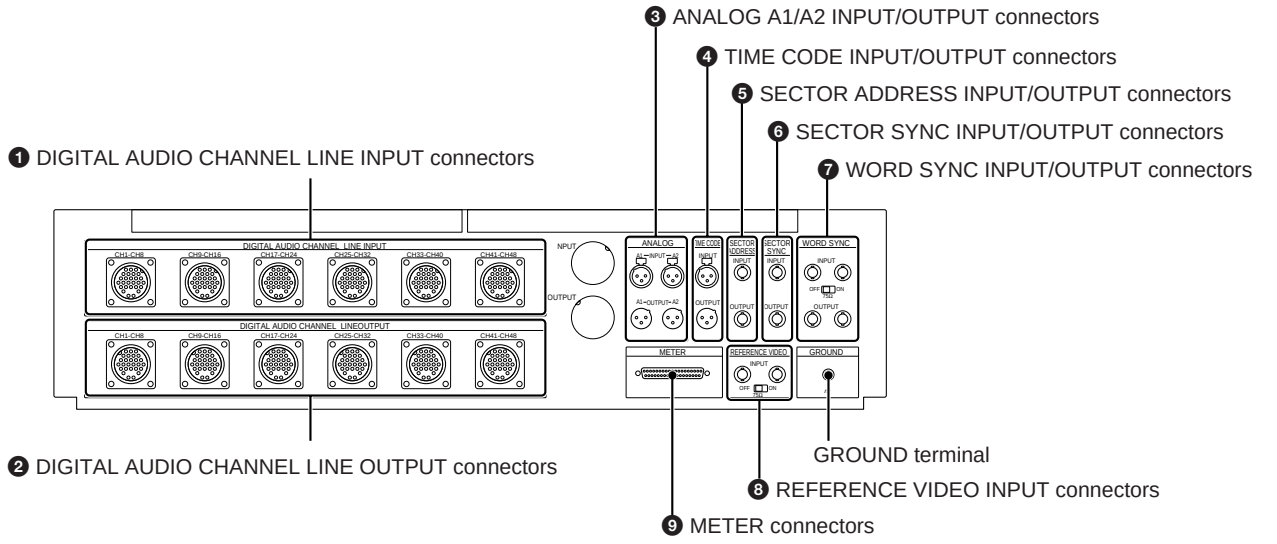
8 EDIT STOP

When this button is pressed during playback, the tape runs in the playback mode for 5 seconds more, then returns to the point where the button was pressed and stops. This button is useful for searching for an edit point when the analog audio tracks are set to the automatic recording (AUTO REC) mode. Analog audio track recording continues for 5 seconds.

9 SHUTTLE

This controls the tape running direction and speed in the STOP mode. Turning the control to the right winds the tape forward and turning the control to the left winds the tape backward. The tape speed can be controlled within a range of 1/10 to 5 times normal.

Connector panel



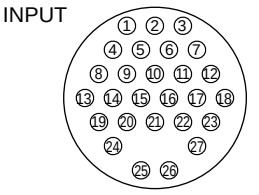
Connector panel

[illegible]

)[illegible]

Input analog audio signals to be recorded on digital audio channels 1 through 48.

Pin assignment



Channel	Pin No.		
	HOT	COLD	GND
1, 9, 17, 25, 33, 41	1	4	8
2, 10, 18, 26, 34, 42	5	6	2
3, 11, 19, 27, 35, 43	3	7	12
4, 12, 20, 28, 36, 44	13	19	24
5, 13, 21, 29, 37, 45	15	14	9
6, 14, 22, 30, 38, 46	17	16	11
7, 15, 23, 31, 39, 47	18	23	27
8, 16, 24, 33, 40, 48	26	25	21

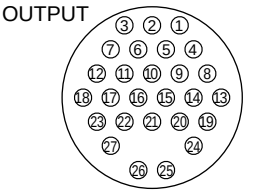
Pin No. 10, 20, 22: No connection

[illegible]

)[illegible]

The signals from digital audio channels 1 through 48 are output from here.

Pin assignment



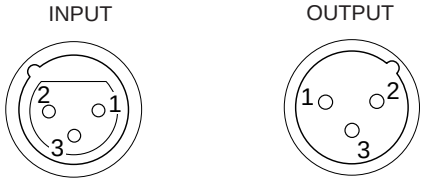
Channel	Pin No.		
	HOT	COLD	GND
1, 9, 17, 25, 33, 41	1	4	8
2, 10, 18, 26, 34, 42	5	6	2
3, 11, 19, 27, 35, 43	3	7	12
4, 12, 20, 28, 36, 44	13	19	24
5, 13, 21, 29, 37, 45	15	14	9
6, 14, 22, 30, 38, 46	17	16	11
7, 15, 23, 31, 39, 47	18	23	27
8, 16, 24, 33, 40, 48	26	25	21

Pin No. 10, 20, 22: No connection

[illegible]

These are the input/output connectors for analog audio signals on analog audio channels A1 and A2.

Pin assignment



Pin No.	Signal
1	GND
2	COLD
3	HOT

[illegible]

These are the input/output connectors for time code signals. The relationship between pin numbers and signals is the same as for the ANALOG A1/A2 INPUT connector and OUTPUT connector.

Note on connectors ❸ and ❹

The pin assignments of these connectors can be changed so that HOT is connected to pin 2 and COLD to pin 3.

For the input, pull out the wires from the CN621 connector on the CN1210 board and connect them to the CN622 connector on the same board.

For the output, pull out the wires from the CN631 connector on the CN1211 board and connect them to the CN632 connector on the same board.

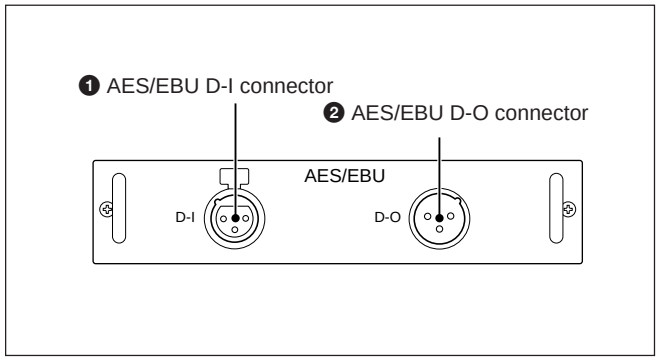
[illegible]

For details on the operation of these connectors see the section entitled "Connectors used for connecting synchronizing signals" (page 10-3).

[illegible]

Connect the optional DMU-3048 digital meter unit.

AES/EBU boards

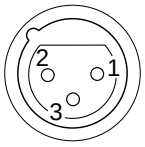


[illegible]

Connect AES/EBU-format digital audio signals to be input to any two of digital audio channels 1 to 48 to this connector.

Pin assignment

Pin No.	Signal
1	SHIELD
2	SIGNAL
3	SIGNAL

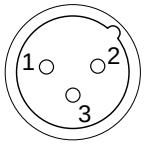


[illegible]

This connector supplies playback signals of any two of digital audio channels 1 to 48 in AES/EBU format.

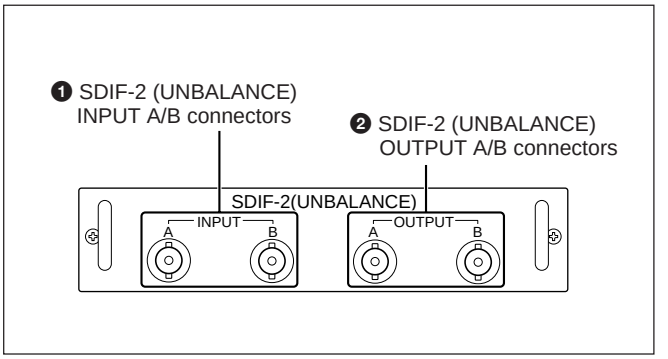
Pin assignment

Pin No.	Signal
1	SHIELD
2	SIGNAL
3	SIGNAL



SDIF-2 (UNBALANCE) board

This board can be mounted in place of an AES/EBU board.



[illegible]

[illegible]

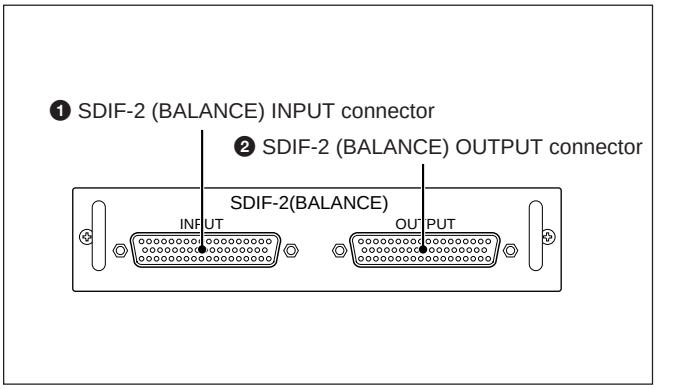
Connect SDIF-2 unbalanced format digital audio signals to be input to any two of digital audio channels 1 to 48 to these connectors.

[illegible]

[illegible]

These connectors supply playback signals of any two of digital audio channels 1 to 48 in SDIF-2 unbalanced format.

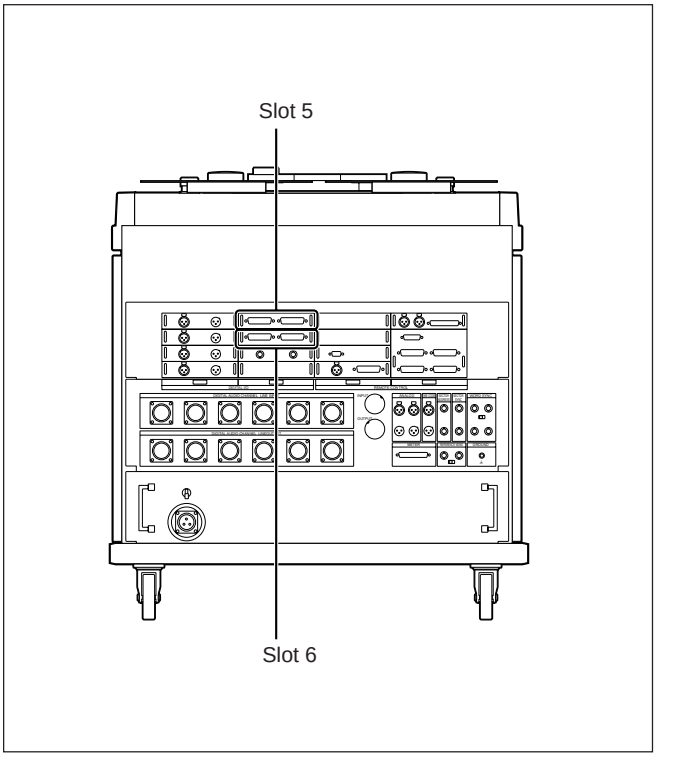
SDIF-2 (BALANCE) board



The effective channels depend on the slot to which the board is mounted.

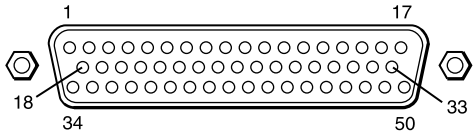
[illegible] Channels 1 to 24 (Normal density)

[illegible] Channels 25 to 48 (Double density)



Connect digital audio signals of SDIF-2 balanced format for digital audio channels 1 to 48 to this connector.

Pin assignment



When the board is mounted in slot 5

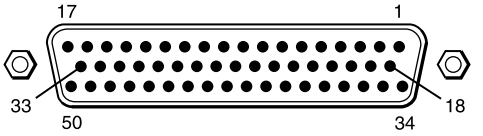
Pin No.	Signal	Pin No.	Signal
1	CH-1 IN–	26	CH-13 IN+
2	CH-1 IN+	27	CH-14 IN–
3	CH-2 IN–	28	CH-14 IN+
4	CH-2 IN+	29	CH-15 IN–
5	CH-3 IN–	30	CH-15 IN+
6	CH-3 IN+	31	CH-16 IN–
7	CH-4 IN–	32	CH-16 IN+
8	CH-4 IN+	33	CH-17 IN–
9	CH-5 IN–	34	CH-17 IN+
10	CH-5 IN+	35	CH-18 IN–
11	CH-6 IN–	36	CH-18 IN+
12	CH-6 IN+	37	CH-19 IN–
13	CH-7 IN–	38	CH-19 IN+
14	CH-7 IN+	39	CH-20 IN–
15	CH-8 IN–	40	CH-20 IN+
16	CH-8 IN+	41	CH-21 IN–
17	CH-9 IN–	42	CH-21 IN+
18	CH-9 IN+	43	CH-22 IN+
19	CH-10 IN–	44	CH-22 IN+
20	CH-10 IN+	45	CH-23 IN–
21	CH-11 IN–	46	CH-23 IN+
22	CH-11 IN+	47	CH-24 IN–
23	CH-12 IN–	48	CH-24 IN+
24	CH-12 IN+	49	blank
25	CH-13 IN–	50	blank

When the board is mounted in slot 6

Pin No.	Signal	Pin No.	Signal
1	CH-25 IN–	26	CH-37 IN+
2	CH-25 IN+	27	CH-38 IN–
3	CH-26 IN–	28	CH-38 IN+
4	CH-26 IN+	29	CH-39 IN–
5	CH-27 IN–	30	CH-39 IN+
6	CH-27 IN+	31	CH-40 IN–
7	CH-28 IN–	32	CH-40 IN+
8	CH-28 IN+	33	CH-41 IN–
9	CH-29 IN–	34	CH-41 IN+
10	CH-29 IN+	35	CH-42 IN–
11	CH-30 IN–	36	CH-42 IN+
12	CH-30 IN+	37	CH-43 IN–
13	CH-31 IN–	38	CH-43 IN+
14	CH-31 IN+	39	CH-44 IN–
15	CH-32 IN–	40	CH-44 IN+
16	CH-32 IN+	41	CH-45 IN–
17	CH-33 IN–	42	CH-45 IN+
18	CH-33 IN+	43	CH-46 IN+
19	CH-34 IN–	44	CH-46 IN+
20	CH-34 IN+	45	CH-47 IN–
21	CH-35 IN–	46	CH-47 IN+
22	CH-35 IN+	47	CH-48 IN–
23	CH-36 IN–	48	CH-48 IN+
24	CH-36 IN+	49	blank
25	CH-37 IN–	50	blank

This connector supplies playback signals of digital audio channels 1 to 48 in SDIF-2 balanced format.

Pin assignment



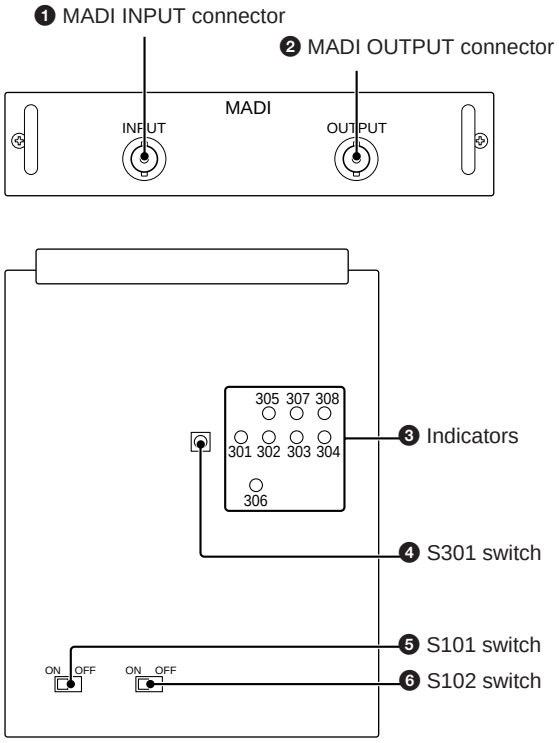
When the board is mounted in slot 5

Pin No.	Signal	Pin No.	Signal
1	CH-1 OUT–	26	CH-13 OUT+
2	CH-1 OUT+	27	CH-14 OUT–
3	CH-2 OUT–	28	CH-14 OUT+
4	CH-2 OUT+	29	CH-15 OUT–
5	CH-3 OUT–	30	CH-15 OUT+
6	CH-3 OUT+	31	CH-16 OUT–
7	CH-4 OUT–	32	CH-16 OUT+
8	CH-4 OUT+	33	CH-17 OUT–
9	CH-5 OUT–	34	CH-17 OUT+
10	CH-5 OUT+	35	CH-18 OUT–
11	CH-6 OUT–	36	CH-18 OUT+
12	CH-6 OUT+	37	CH-19 OUT–
13	CH-7 OUT–	38	CH-19 OUT+
14	CH-7 OUT+	39	CH-20 OUT–
15	CH-8 OUT–	40	CH-20 OUT+
16	CH-8 OUT+	41	CH-21 OUT–
17	CH-9 OUT–	42	CH-21 OUT+
18	CH-9 OUT+	43	CH-22 OUT–
19	CH-10 OUT–	44	CH-22 OUT+
20	CH-10 OUT+	45	CH-23 OUT–
21	CH-11 OUT–	46	CH-23 OUT+
22	CH-11 OUT+	47	CH-24 OUT–
23	CH-12 OUT–	48	CH-24 OUT+
24	CH-12 OUT+	49	blank
25	CH-13 OUT–	50	blank

When the board is mounted in slot 6

Pin No.	Signal	Pin No.	Signal
1	CH-25 OUT–	26	CH-37 OUT+
2	CH-25 OUT+	27	CH-38 OUT–
3	CH-26 OUT–	28	CH-38 OUT+
4	CH-26 OUT+	29	CH-39 OUT–
5	CH-27 OUT–	30	CH-39 OUT+
6	CH-27 OUT+	31	CH-40 OUT–
7	CH-28 OUT–	32	CH-40 OUT+
8	CH-28 OUT+	33	CH-41 OUT–
9	CH-29 OUT–	34	CH-41 OUT+
10	CH-29 OUT+	35	CH-42 OUT–
11	CH-30 OUT–	36	CH-42 OUT+
12	CH-30 OUT+	37	CH-43 OUT–
13	CH-31 OUT–	38	CH-43 OUT+
14	CH-31 OUT+	39	CH-44 OUT–
15	CH-32 OUT–	40	CH-44 OUT+
16	CH-32 OUT+	41	CH-45 OUT–
17	CH-33 OUT–	42	CH-45 OUT+
18	CH-33 OUT+	43	CH-46 OUT–
19	CH-34 OUT–	44	CH-46 OUT+
20	CH-34 OUT+	45	CH-47 OUT–
21	CH-35 OUT–	46	CH-47 OUT+
22	CH-35 OUT+	47	CH-48 OUT–
23	CH-36 OUT–	48	CH-48 OUT+
24	CH-36 OUT+	49	blank
25	CH-37 OUT–	50	blank

MADI boards



❸ Indicators

These indicators reflect the state of the MADI-format digital audio signal input to the MADI INPUT connector and the operating state of the CPU.

DIO (red): Normally off and lights when the CPU (IC304) is in the halt state.

DIO (red): Lights when an error occurs in one of the memory ICs mounted on this board.

(green): an error in HM628128 (IC307, IC308)

(red): an error in IDT71256 (IC204)

DIO (red): Lights when there is a violation or sync error in the input MADI-format signal. These errors are fatal, and when they occur, no input signals are received. If the INPUT SELECT switch on the system control block is set to DIGITAL, the DIGITAL lamp flashes.

DIO (yellow): Lights whenever a block bit error occurs on the receiving side.

DIO (yellow): Temporarily lights when a CRC error or parity error occurs in the input MADI signal.

(green): Lights or goes off regardless of the state of the input signal and the operating state of the CPU.

DIO (green): Lights when the CPU is operating (normally on).

❹

Pressing this switch resets the CPU. In normal operation, do not touch this switch.

❺

This switch is set to ON at the factory, and should not be touched.

❻

This switch is set to ON at the factory, and should not be touched.

❼

When this switch is set to ON, the unit can be set to 2-track 24-bit mode. Normally, use the unit in 1-track 24-bit mode with this switch set to OFF.

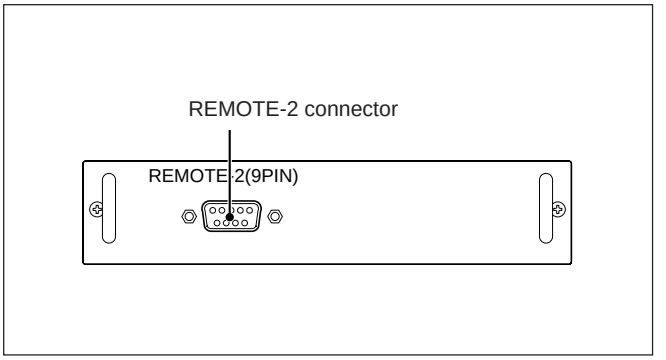
(MADI)

Connect MADI-format digital audio signals to this connector. Channels 1 to 48 channels of the 56 channels of the MADI format are effective.

(MADI)

This connector supplies MADI-format digital audio signals. Channels 1 to 48 channels of the 56 channels of the MADI format are output.

REMOTE-2 (9PIN) board

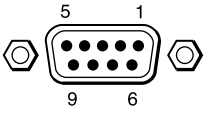


REMOTE-2 (9PIN) connector

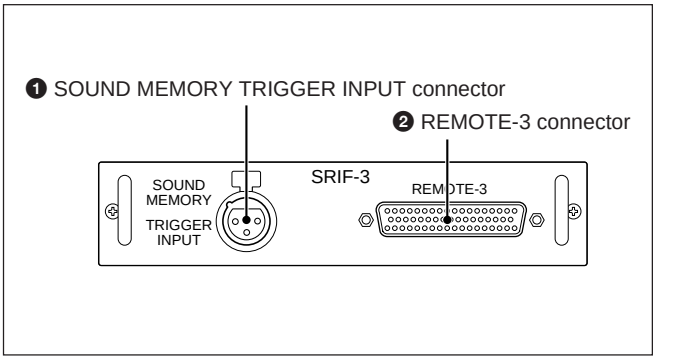
Connect a video editing control system.

Pin assignment

Pin No.	Signal
1	F.G.
2	RXD (–)
3	TXD (+)
4	TX COM
5	N.C.
6	RXCOM
7	RXD (+)
8	TXD (–)
9	F.G.



SRIF-3 board

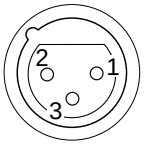


❶ SOUND MEMORY TRIGGER INPUT connector

Connect a trigger signal for sound memory.

Pin assignment

Pin No.	Signal
1	GND
2	HOT
3	COLD

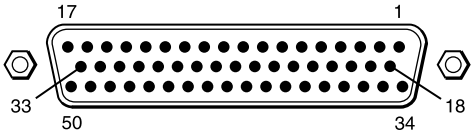


For use of this connector, see section 5-6-2, “Inputting a Trigger signal to the PCM-3348HR” (page 5-12).

[illegible]

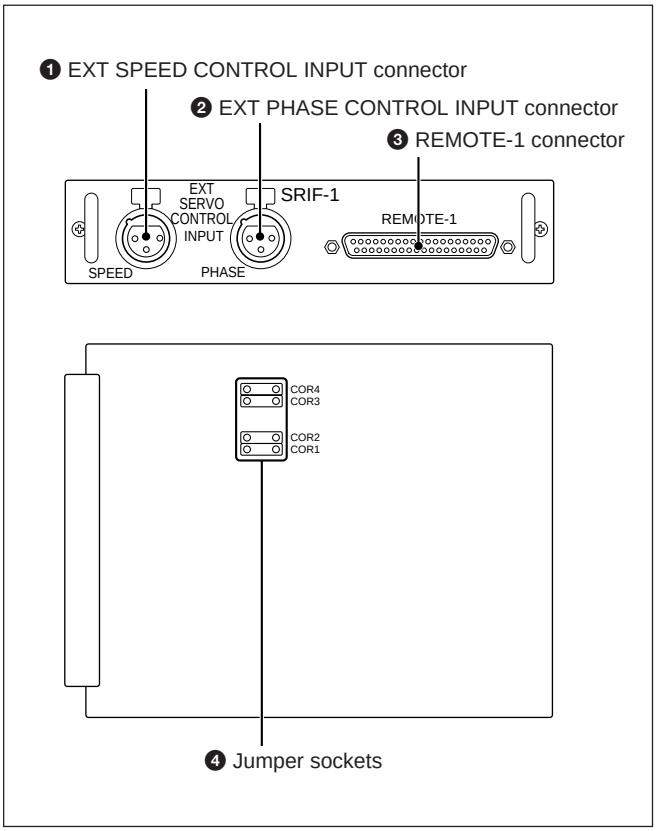
Connect the RM-3348HR remote control unit.

Pin assignment



Pin No.	Signal	Pin No.	Signal
1	GND	26	DIR (–)
2	GND	27	N.C.
3	RSTB (+)	28	N.C.
4	RSTB (–)	29	RWCK(+)
5	TSTB(+)	30	RWCK(–)
6	TSTB(–)	31	TWCK(+)
7	DAT0(+)	32	TWCK(–)
8	DAT0(–)	33	TPBTC(+)
9	DAT1(+)	34	TPBTC(–)
10	DAT1(–)	35	RSADR(+)
11	DAT2(+)	36	RSADR(–)
12	DAT2(–)	37	RSCK(+)
13	DAT3(+)	38	RSCK(–)
14	DAT3(–)	39	TSADR(+)
15	DAT4(+)	40	TSADR(–)
16	DAT4(–)	41	TSADR(+)
17	N.C.	42	TSCK(–)
18	N.C.	43	TPLS(+)
19	DAT5(+)	44	TPLS(–)
20	DAT5(–)	45	TDIR(+)
21	DAT6(+)	46	TDIR(–)
22	DAT6(–)	47	ATN(+)
23	DAT7(+)	48	ATN(–)
24	DAT7(–)	49	GND
25	DIR(+)	50	FRAME GND

SDIF-1 board

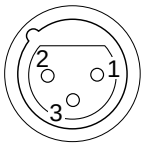


[illegible]

By applying a DC voltage from –10 to +10 V to this connector, the tape transport speed can be continuously changed from –16 m/sec. to +16 m/sec.

Pin assignment

Pin No.	Signal
1	GND
2	COLD
3	HOT



[illegible]

By applying a DC voltage to this connector, the playback speed can be continuously changed as mentioned on the next page.
The pin assignment is the same as that of the EXT SPEED CONTROL INPUT connector.

The relationship between the DC voltage and speed variation is shown below.

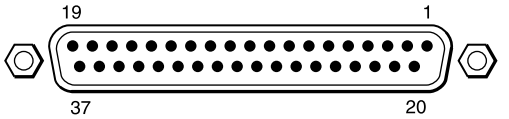
DC voltage	Playback speed variation	
	VARI SYNC ON[a)]	VARI SYNC OFF[a)]
–10.0 V	–12.5%	–50.0%
–2.5 V	–12.5%	–12.5%
0 V	0%	0%
+2.5 V	+12.5%	+12.5%
+10.0 V	+12.5%	+50.0%

a) For the VARI SYNC switch setting, see “MC board” (page A-20).

[illegible]

Connect a time code synchronizer to control tape transport.

Pin assignment



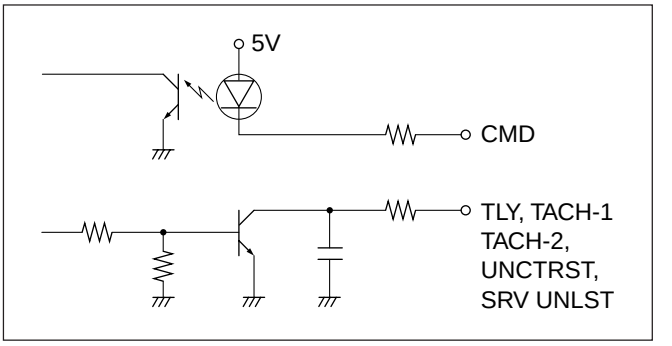
Pin No.	Signal	Pin No.	Signal
1	PLAY.TLY/	21	unused
2	REC.TLY/	22	unused
3	REW.TLY/	23	unused
4	FF.TLY/	24	unused
5	STOP.TLY/	25	GND5
6	REH.TLY/[a)]	26	GND4
7	UNCTL.ST/	27	GND3
8	EXT-SPD.TLY/	28	GND2
9	EXT-PH.TLY/	29	GND1
10	+VCC1	30	EXT-PH.CMD/
11	+VCC2	31	EXT-SPD.CMD/
12	+VCC3	32	REH.CMD/[c)]
13	+VCC4	33	STOP.CMD/
14	+VCC5	34	FF.CMD/
15	TACH-1.OUT/	35	REW.CMD/
16	TACH-2.OUT/	36	REC.CMD/
17	SRV-LOCK.SY.	37	PLAY.CMD/
18	unused		
19	unused		
20	REH-ST.CMD/[b)]		

a) Rehearsal tally signal, which becomes active when both the REH.CMD and REH-ST.CMD signals are being accepted.
b) Rehearsal status command signal
c) Rehearsal command signal

Signal definition

Negative logic
REH. CMD. /
Signal name Attribute

For usage of the rehearsal command, see Section 11-1-2, “Rehearsal Control by the Synchronizer” (page 11-4).

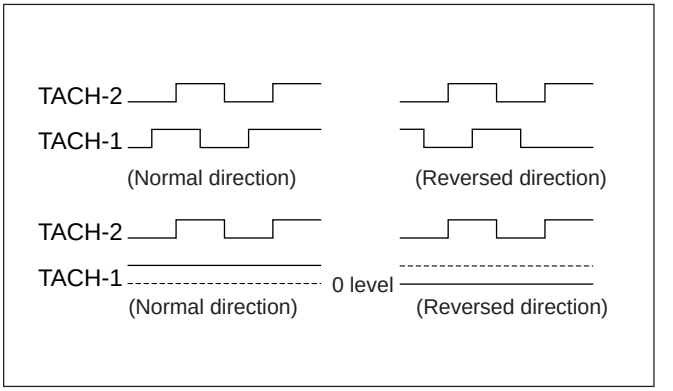


Equalizer circuit

[illegible] 4

Changing the jumper positions, the output format of the TACH-1 OUT (pin 15) and TACH-2 OUT (pin 16) of the REMOTE-1 connector is switched as follows.

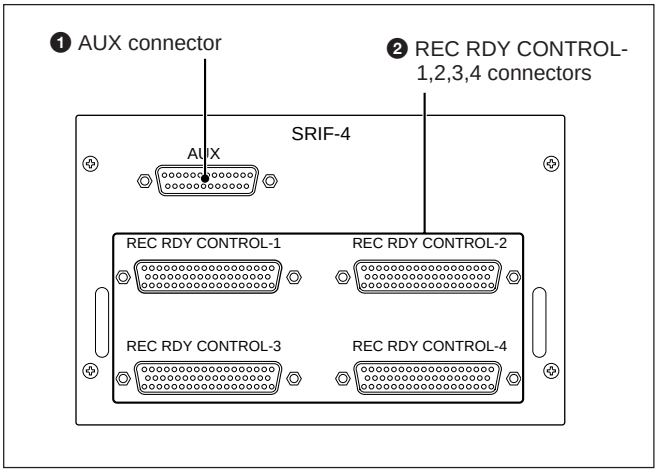
Output format	TACH-2	TACH-1	Jumper position
Type 1	250 Hz	250 Hz	COR2, COR4
Type 2	1 kHz	Direction signal	COR1, COR3



Signal waveform

http://getMANUAL.com

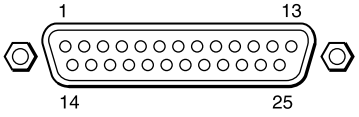
SDIF-4 board



[illegible]

Connect a mixing console incorporated with the channel REC READY function to control REC READY/SAFE switching of the time code channel and analog audio channels A1 and A2 of the PCM-3348HR.

Pin assignment



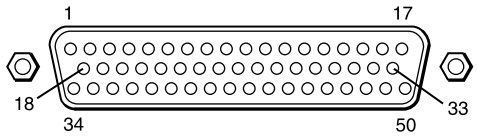
Pin No.	Signal	Pin No.	Signal
1	FRAME GND	14	unused
2	RDY A1	15	unused
3	RDYS A1	16	CRTN TC
4	RECS A1	17	SRTN TC
5	RDY A2	18	unused
6	RDYS A2	19	N.C.
7	RECS A2	20	N.C.
8	CRTN A1	21	unused
9	SRTN A1	22	N.C.
10	RDY TC	23	N.C.
11	RDYS TC	24	unused
12	RECS TC	25	N.C.
13	unused		

Signal definition
RDY: REC READY command signal
RDYS: REC READY status signal
RECS: REC status signal
CRTN: Command return signal
SRTN: Status return signal

[illegible]

Connect a mixing console incorporated with the REC READY function to control REC READY/SAFE switching of the digital audio channels of the PCM-3348HR.
The CONTROL-1 connector is for channels 1 to 12, the CONTROL-2 connector is for channels 13 to 24, the CONTROL-3 connector is for channels 25 to 36, and the CONTROL-4 connector is for channels 37 to 48.

Pin assignment



REC RDY CONTROL-1 connector

Pin No.	Signal	Pin No.	Signal
1	FRAME GND	26	RDY 7
2	RDY1	27	RDYS 7
3	RDYS 1	28	RECS 7
4	RECS 1	29	RDY 8
5	RDY 2	30	RDYS 8
6	RDYS 2	31	RECS 8
7	RECS 2	32	CRTN 4
8	CRTN 1	33	SRTN 4
9	SRTN 1	34	RDY 9
10	RDY 3	35	RDYS 9
11	RDYS 3	36	RECS 9
12	RECS 3	37	RDY 10
13	RDY 4	38	RDYS 10
14	RDYS 4	39	RECS 10
15	RECS 4	40	CRTN 5
16	CRTN 2	41	SRTN 5
17	SRTN 2	42	RDY 11
18	RDY 5	43	RDYS 11
19	RDYS 5	44	RECS 11
20	RECS 5	45	RDY 12
21	RDY 6	46	RDYS 12
22	REYS 6	47	RECS 12
23	RECS 6	48	CRTN 6
24	CRTN 3	49	SRTN 6
25	SRTN 3	50	FRAME GND

REC RDY CONTROL-2 connector

Pin No.	Signal	Pin No.	Signal
1	FRAME GND	26	RDY 19
2	RDY13	27	RDYS 19
3	RDYS 13	28	RECS 19
4	RECS 13	29	RDY 20
5	RDY 14	30	RDYS 20
6	RDYS 14	31	RECS 20
7	RECS 14	32	CRTN 10
8	CRTN 7	33	SRTN 10
9	SRTN 7	34	RDY 21
10	RDY 15	35	RDYS 21
11	RDYS 15	36	RECS 21
12	RECS 15	37	RDY 22
13	RDY 16	38	RDYS 22
14	RDYS 16	39	RECS 22
15	RECS 16	40	CRTN 11
16	CRTN 8	41	SRTN 11
17	SRTN 8	42	RDY 23
18	RDY 17	43	RDYS 23
19	RDYS 17	44	OK 23
20	RECS 17	45	RDY 24
21	RDY 18	46	RDYS 24
22	RDYS 18	47	RECS 24
23	RECS 18	48	CRTN 12
24	CRTN 9	49	SRTN 12
25	SRTN 9	50	FRAME GND

REC RDY CONTROL-3 connector

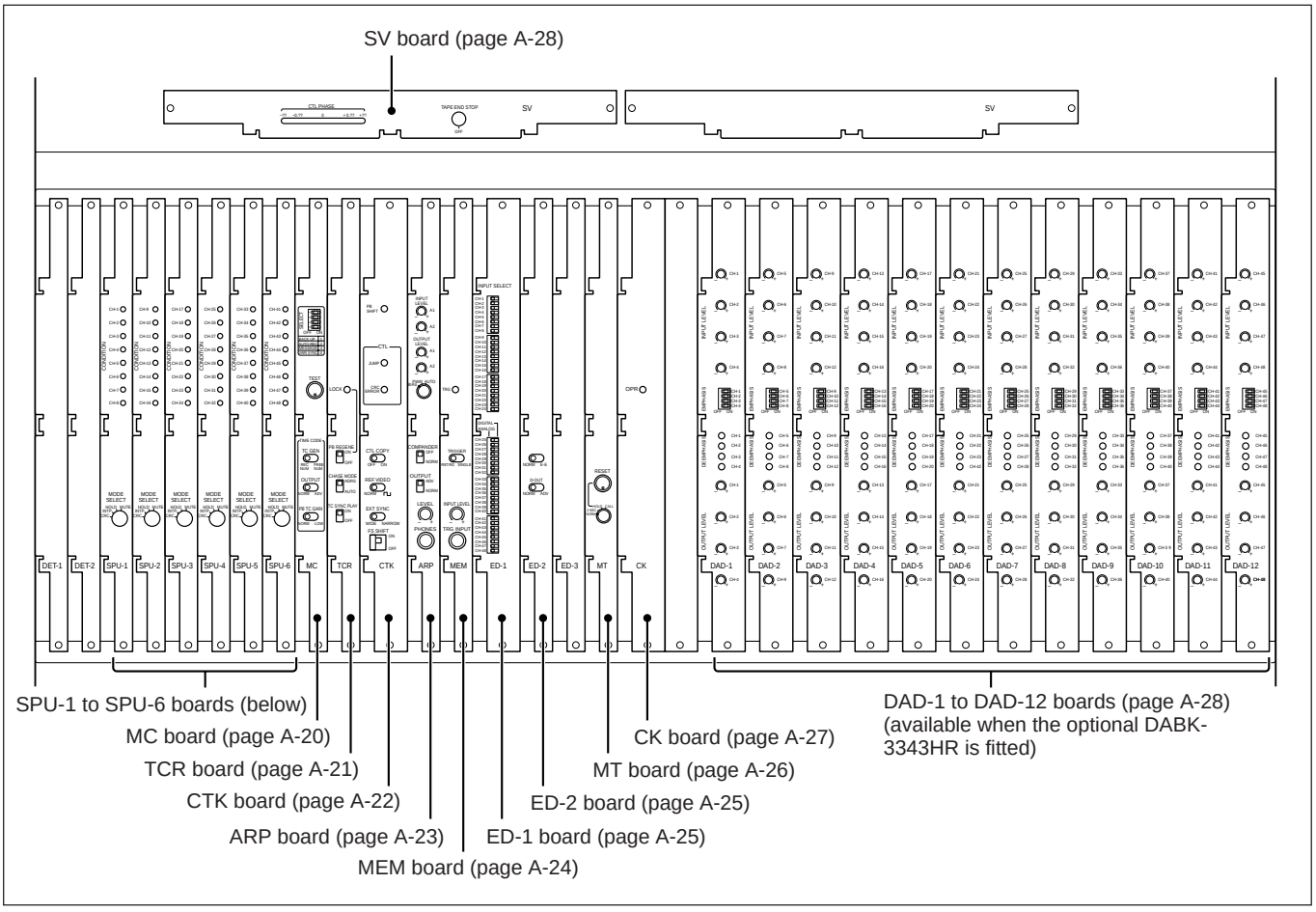
Pin No.	Signal	Pin No.	Signal
1	FRAME GND	26	RDY 31
2	RDY25	27	RDYS 31
3	RDYS 25	28	RECS 31
4	RECS 25	29	RDY 32
5	RDY 26	30	RDYS 32
6	RDYS 26	31	RECS 32
7	RECS 26	32	CRTN 16
8	CRTN 13	33	SRTN 16
9	SRTN 13	34	RDY 33
10	RDY 27	35	RDYS 33
11	RDYS 27	36	RECS 33
12	RECS 27	37	RDY 34
13	RDY 28	38	RDYS 34
14	RDYS 28	39	RECS 34
15	RECS 28	40	CRTN 17
16	CRTN 14	41	SRTN 17
17	SRTN 14	42	RDY 35
18	RDY 29	43	RDYS 35
19	RDYS 29	44	RECS 35
20	RECS 29	45	RDY 36
21	RDY 30	46	RDYS 36
22	RDYS 30	47	RECS 36
23	RECS 30	48	CRTN 18
24	CRTN 15	49	SRTN 18
25	SRTN 15	50	FRAME GND

REC RDY CONTROL-4 connector

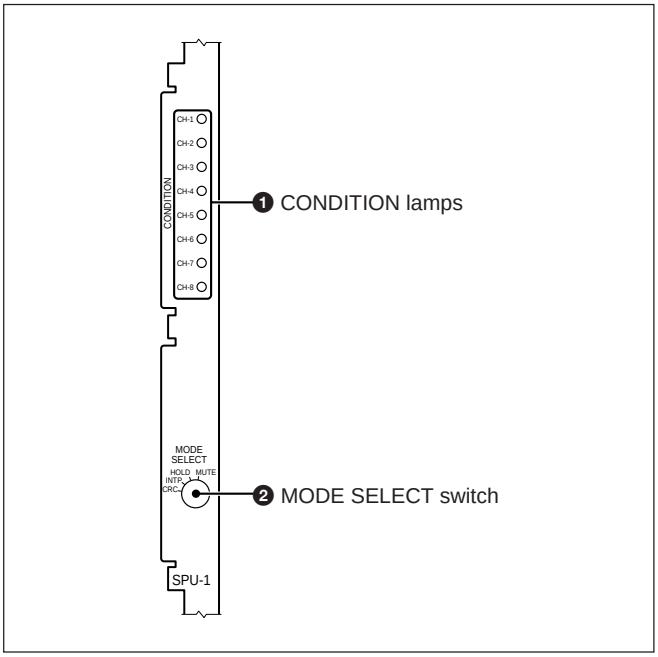
Pin No.	Signal	Pin No.	Signal
1	FRAME GND	26	RDY 43
2	RDY37	27	RDYS 43
3	RDYS 37	28	RECS 43
4	RECS 37	29	RDY 44
5	RDY 38	30	RDYS 44
6	RDYS38	31	RECS 44
7	RECS 38	32	CRTN 22
8	CRTN 19	33	SRTN 22
9	SRTN 19	34	RDY 45
10	RDY 39	35	RDYS 45
11	RDYS 39	36	RECS 45
12	RECS 39	37	RDY 46
13	RDY 40	38	RDYS 46
14	RDYS 40	39	RECS 46
15	RECS 40	40	CRTN 23
16	CRTN 20	41	SRTN 23
17	SRTN 20	42	RDY 47
18	RDY 41	43	RDYS 47
19	RDYS 42	44	RECS 47
20	RECS 41	45	RDY 48
21	RDY 42	46	RDYS 48
22	RDYS 42	47	RECS 48
23	RECS 42	48	CRTN 24
24	CRTN 21	49	SRTN 24
25	SRTN 21	50	FRAME GND

Signal definition
RDY: REC READY command signal
RDYS: REC READY status signal
RECS: REC status signal
CRTN: Command return signal
SRTN: Status return signal

Internal Boards


SV board (page A-28)
SPU-1 to SPU-6 boards (below)
MC board (page A-20)
TCR board (page A-21)
CTK board (page A-22)
ARP board (page A-23)
MEM board (page A-24)
ED-1 board (page A-25)
ED-2 board (page A-25)
MT board (page A-26)
CK board (page A-27)
DAD-1 to DAD-12 boards (page A-28)
(available when the optional DABK-3343HR is fitted)

SPU-1 to SPU-6 boards



CONDITION

These lamps light if an error occurs on the corresponding digital audio channel. Use the MODE SELECT switch to determine which errors should be reported.

MODE SELECT

This switch determines which errors the CONDITION lamps report, as follows:

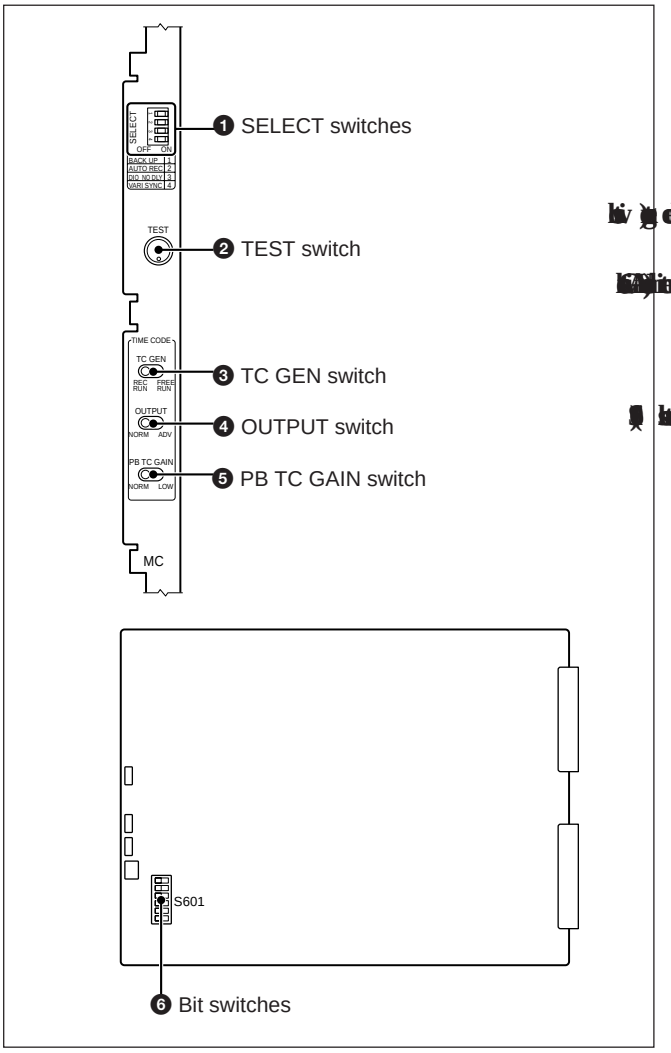
CRC: When a CRC error is detected

INTP: When error correction is not possible and the average of surrounding correctly played back words has been used for interpolation

HOLD: When error correction is not possible and the output has been held at the last correctly played back word

MUTE: When neither of the above error concealments is possible and the output has been muted.

MC board



MC board

S601

1 (BACKUP) Switches the PCM-3348HR memory backup function on and off.
For details, see Section 2-6, "Memory Backup Function" (page 2-18).

2 (AUTOREC) Switches the automatic recording mode for the analog audio channels on and off.
For details, see "Automatic recording of analog audio channels" (page 3-14).

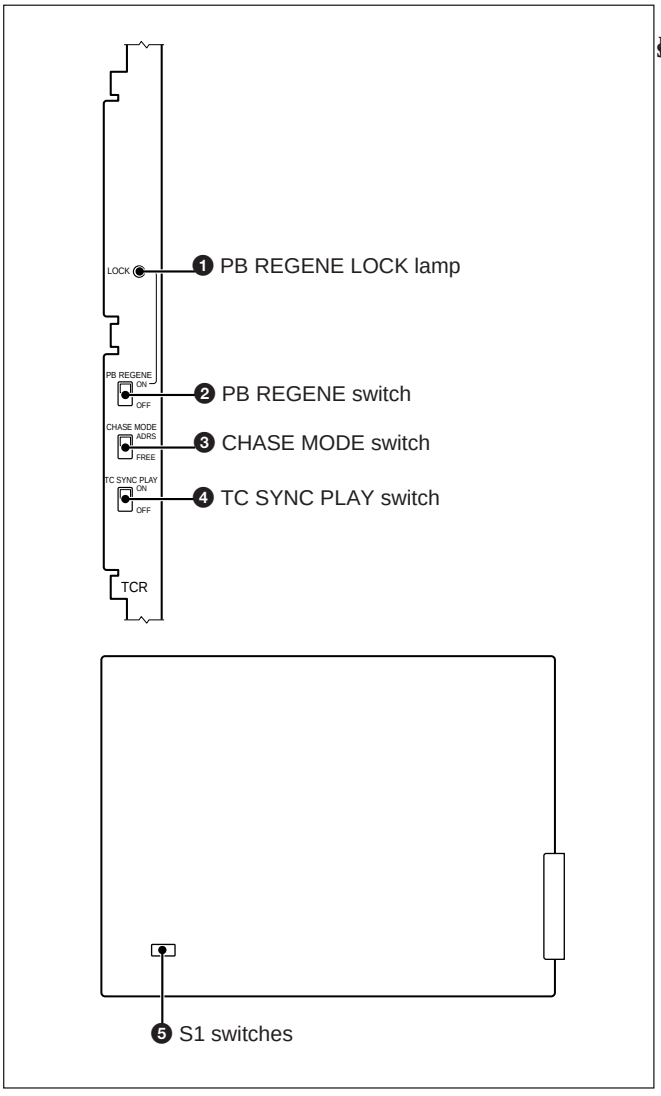
3 (DIONLY) Determines whether to connect the OXF-R3 mixing console using the input/output connectors of the MADI board.
ON: To connect the OXF-R3
OFF: Not to connect the OXF-R3

4 (VARISYNC) Switches the varisync function on and off.
For details, see Section 3-7-8, "Time Code Sync Playback" (page 3-25).

5 For maintenance purposes only. Do not touch.

6 Select the operation mode. All the switches are set to the left positions at the factory.
1 (AUTOASM): Determines the CTL recording mode during assemble recording.
Right: Forced assemble recording
Left: Automatic assemble recording
For details, see Section 3-5-1, "What Is Assembling Recording?" (page 3-10).
2 (CTLPRO): Switches the CTL protection function ON (left) and OFF (right).
3 (SIMODE): Switches ON (right) and OFF (left) the simultaneous playback function for recording on a prestriped tape.
4 (MECHK): For test purposes. Do not touch. (Factory-setting: OFF)
5 (HEAD): For test purposes. Do not touch. (Factory-setting: OFF)
6 (PHASE): Switches the internal time code generator phase correction function ON (left) and OFF (right).
7: For test purposes. Do not touch. (Factory-setting: OFF)
8 (ERRSL): Determines whether the tape time display does (ON) or does not (OFF) display warning codes when the SYSTEM WARNING lamp is lit. (Factory-setting: OFF)

TCR board



TCR board

[illegible]

Lights when the playback time code is correctly regenerated. It goes off if playback time code input fails, even if regeneration is being continued.

[illegible]

Turns on and off time code regeneration.

[illegible]

Sets the time code chase mode,

ADRS: Address mode

FREE: Free mode

For details, see Section 7-2-4, "Chase Mode" (page 7-6).

[illegible] 4

Turns on and off the time code sync playback.

[illegible] 5

Set the operations related to the time code.

1 [illegible]

Determines whether time code interpolation is to be performed in fast-forward and rewind modes.

ON: To perform the interpolation and output the time code.

OFF: Not to perform the interpolation and to mute the time code output in fast-forward and rewind modes.

2 [illegible]

Select the frame frequency of the time code interpolation output in fast-forward and rewind modes when the playback time code is of the NTSC format.

ON: 30 Hz

OFF: 29.97 Hz (NDF/DF)

This switch has no effect on other time code formats than NTSC.

3 [illegible]

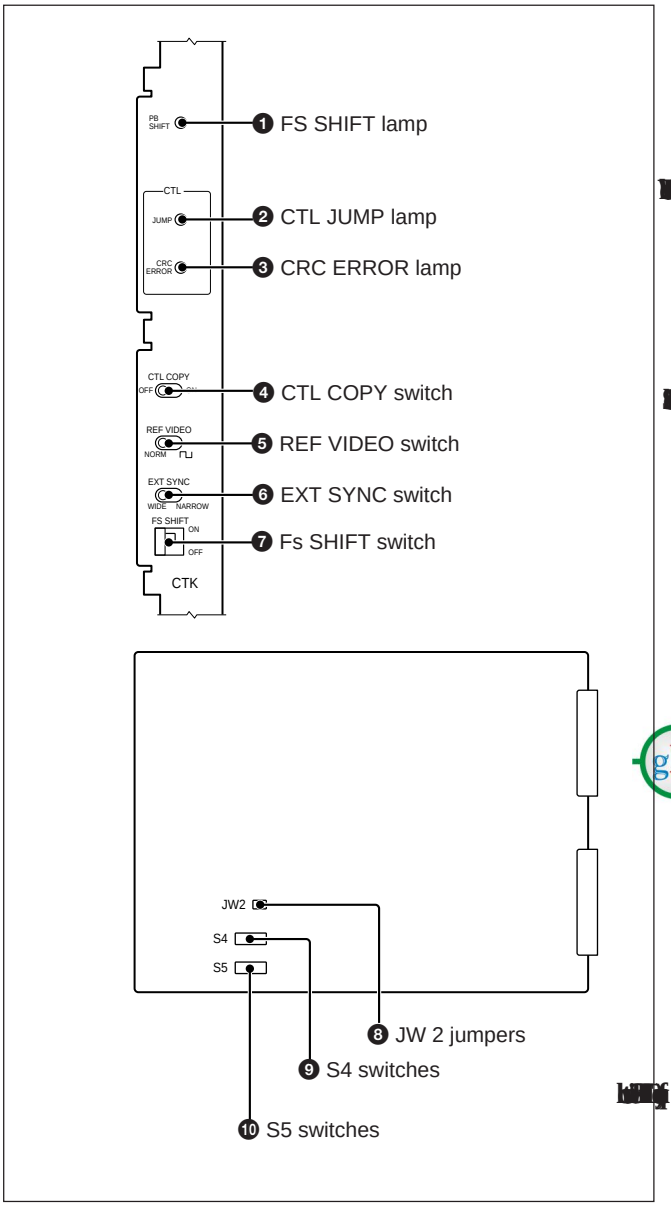
Determines the condition for the playback time code regeneration output from the TIME CODE OUTPUT connector.

ON: To output the regenerated time code only when the PB REGENE switch is set to ON and the PB REGENE LOCK lamp is lit. No signal is output in other conditions.

OFF: To output the time code regardless of the PB REGENE switch setting.

Note, however, that a bit error may occur at the moment of switching from the playback time code to the regenerated time code when this switch is set to OFF.

CTK board



CTK board

1 This lights when the FS SHIFT switch is pressed.

2 This lights whenever there is a discontinuity in the CTL addresses.

3 This lights when there is a CRC error in the CTL played back.

4

Specifies whether or not to copy CTL data together with the digital audio signals when making a backup copy.

ON: Copy the CTL data.

OFF: Do not copy the CTL data (Factory setting).

5

Selects the signal to be input to the REFERENCE VIDEO INPUT connector on the rear panel.

NORM: NTSC or PAL composite video signal

⊓⊔ : square wave (30 Hz, 29.97 Hz, 25 Hz, 24 Hz)

6

Set the range in which the PCM-3348HR is synchronized with an external sync signal (clock accuracy).

WIDE: To permit the PCM-3348HR to synchronize with an external word sync signal of 38.54 to 54.0 kHz.

The tape transport speed can be adjusted when the PCM-3348HR is being synchronized with the reference video signal (including the phase adjustment operation).

NARROW: To permit the PCM-3348HR to synchronize with an external word sync signal which is ± 50 ppm of the selected sampling frequency (this position cannot be used for variable-sync playback).

The tape transport speed cannot be adjusted when the PCM-3348HR is being synchronized with the reference video signal.

7

Shifts the sampling frequency.

For details, see "Sampling frequency for prestriping or advance recording" (page 2-9).

8 **9** **10**

When a square wave is input to the REFERENCE VIDEO INPUT connector, these three switches determine the frequency division ratio required to produce the reference frequency of 30 Hz, 29.97 Hz, 25 Hz, or 24 Hz.

The relationship between the JW2 jumper position and the frequency division factor is as follows:

Left (1/1): The input signal is used unaltered as the synchronizing signal.

Center (1/2 to 1/7): Set the ratio from 1/2 to 1/7 using S5 switches No.1 to No.3.

Right (1/8 to 1/999): Set the ratio from 1/8 to 1/999 using S5 switches No.5 to No.8 and S4 switches No.1 to No.8.

Setting the ratio from 1/2 to 1/7 (JW2 jumper in center position)

The frequency is divided by the number represented in binary by S5 switches No.1 to No.3.

No.1 1
No.2 2
No.3 4

A switch in the ON position represents a 1 and in the OFF position 0. Thus if all three switches are in the ON position, the frequency division factor is 1/7.

Example:

If the signal supplied is 60 Hz, for a 30 Hz synchronizing signal, set switch No.2 only to ON and the others to OFF, thus dividing by 2.

Setting the ratio from 1/8 to 1/999 (JW2 jumper in right position)

The switches represent the denominator of the division factor, in BCD notation as follows:

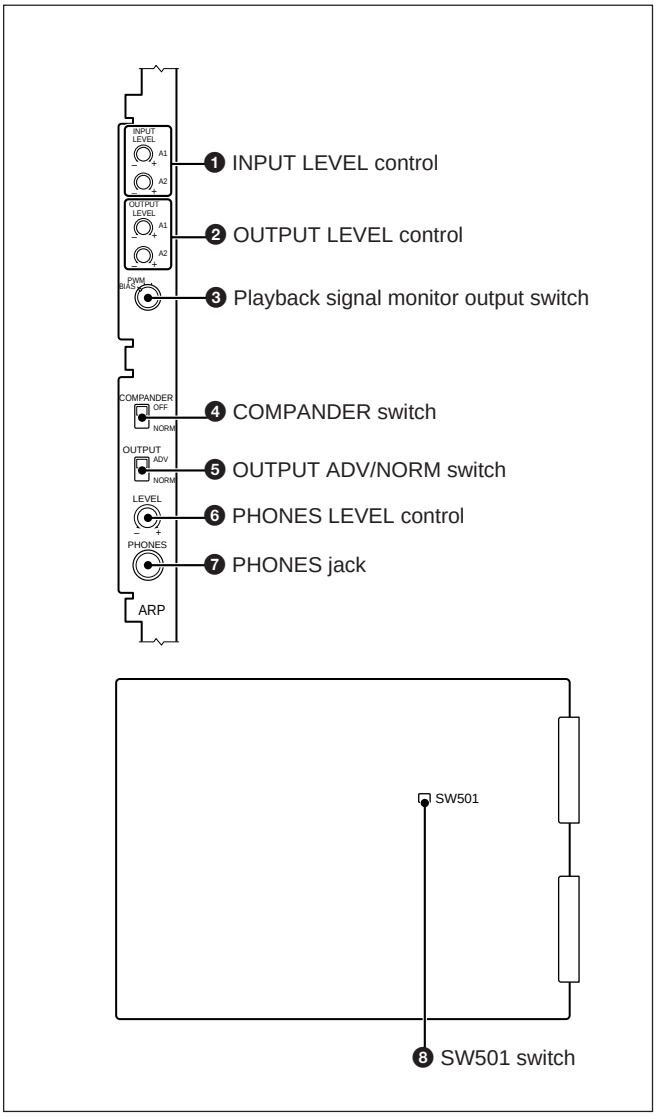
No.5 to No.8 units (No.5=1, No.6=2, No.7=4, No.8=8)
No.1 to No.4 tens (No.1=1, No.2=2, No.3=4, No.4=8)
No.5 to No.8 hundreds (No.5=1, No.6=2, No.7=4, No.8=8)

Example:

To convert and input a 9.6-kHz square wave to a 30-Hz synchronizing signal requires dividing by 320. In this case, set the S4 and S5 switches as follows:

No.5 to No.8 all OFF (units value 0)
No.1 to No.4 No.2 (2) only ON (tens value 2)
No.5 to No.8 No.5 (1) and No.6 (2) only ON (hundreds value 3)

ARP board



ARP board

1

This adjusts the input signal level to analog audio channels A1 and A2.

Adjustment –2dB to +10dB

2

This adjusts the output signal level from analog audio channels A1 and A2.

Adjustment –10dB to +2dB

[illegible] (3)

For playback signal monitoring, this switch determines the analog audio output signal and the signal output to the headphones.

PWM: Plays back a signal PWM recorded to the analog audio tracks.
Use this setting when playing back a tape recorded on this unit or the PCM-3324S.

BIAS: Plays back a signal bias recorded to the analog audio tracks.
Use this setting when playing back a tape recorded on the PCM-3324A/3324.

(4) [illegible]

Switches on and off the compander function, compressing while recording the analog audio signal and expanding during playback.

OFF: Disables the compander function. Use this setting when recording and playing back signals other than audio signals.

NORM: Enables the compander function. Use this setting when recording and playing back audio signals.

(5) [illegible]

When outputting an analog audio channel playback signal, this switch determines whether or not to provide a delay.

ADV: Output the signal with no delay.

NORM: Output with a delay equal to the delay on the digital audio tracks (normal setting).

[illegible]

Adjusts the volume of the headphones for monitoring analog audio channels A1 and A2.

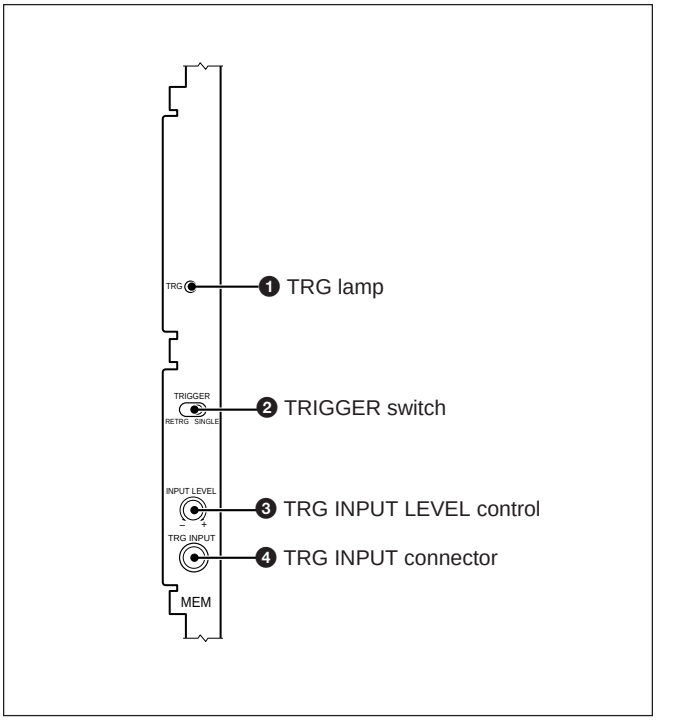
[illegible]

Connect the headphones for monitoring analog audio channels A1 and A2.

[illegible]

This switch is for factory adjustment only. Do not change the setting (NORM).

MEM board



MEM board

[illegible] (1)

Lights when the external trigger signal to be input via the TRG INPUT connector exceeds the level set with the TRG INPUT LEVEL control.

[illegible] (2)

Sets the external trigger mode for the sound memory.

RETRG: Retrigger mode

SNGLE: Retrigger inhibit mode

For details, see "5-6 External Trigger Mode" (page 5-12).

[illegible] (3)

Adjusts the input level of the external trigger signal for the sound memory.

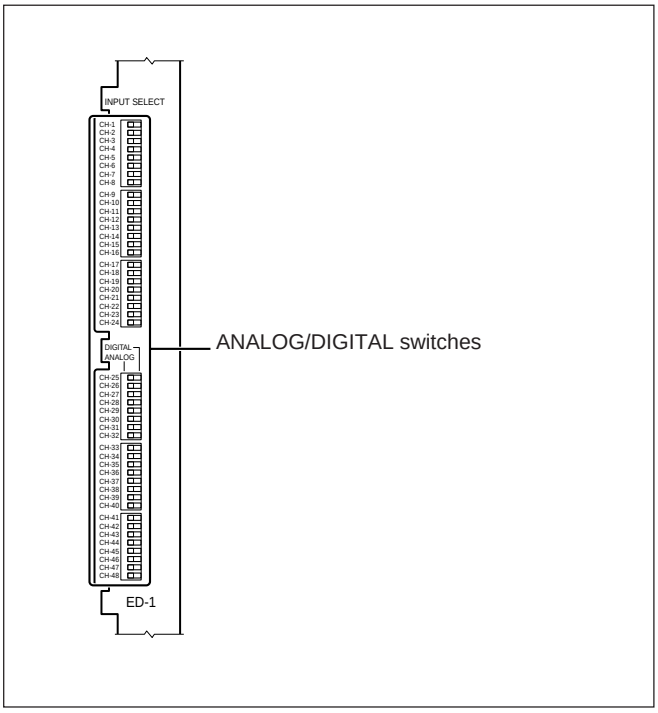
Adjustment range: +4dBs to –16dBs

For details, see "5-6-3 Inputting a Trigger Signal to the RM-3348HR" (page 5-13).

[illegible] (4)

Accepts an external trigger signal for the sound memory.

ED-1 board



ED-1 board

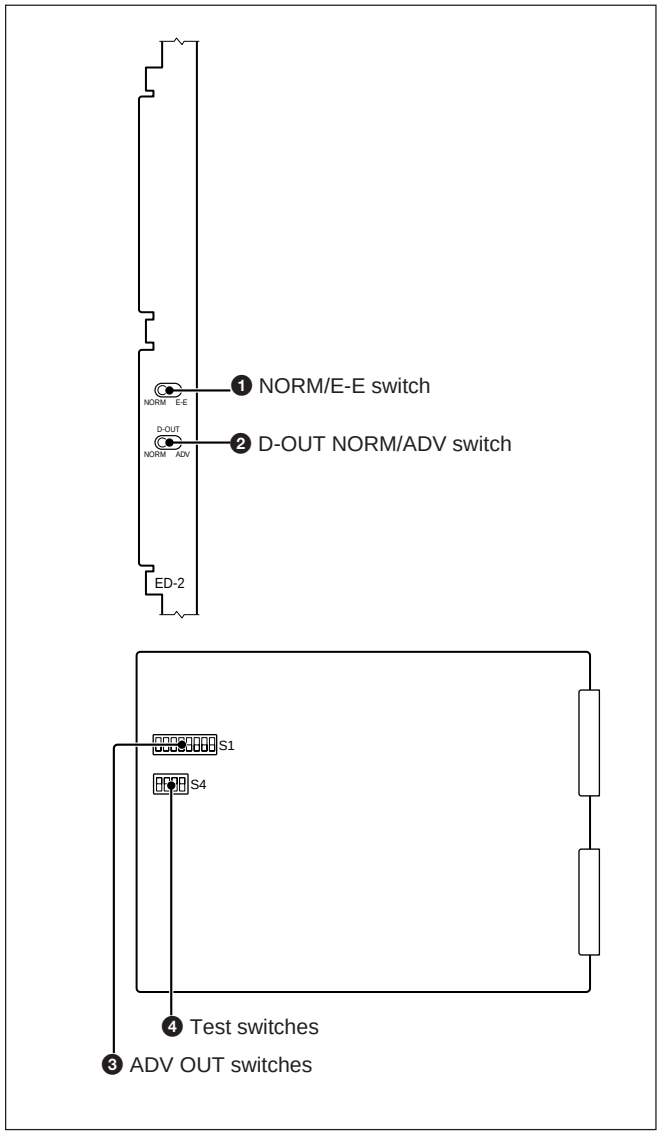
ANALOG

Select the input signals for the respective channels when the INPUT SELECT switch of the system control block is set to INDIVI.

ANALOG: The analog audio signals connected via the DIGITAL AUDIO CHANNEL LINE INPUT connectors on the rear panel (factory-set position).

DIGITAL : The digital audio signal selected at the system control block.

ED-2 board



ED-2 board

[illegible]

This switch controls the signal flow when performing a circuit check.

NORM: Normal operating mode.

E-E: Circuit check mode. In this mode, the output of the encoder is input directly to the decoder, without passing through the head or affecting the tape.

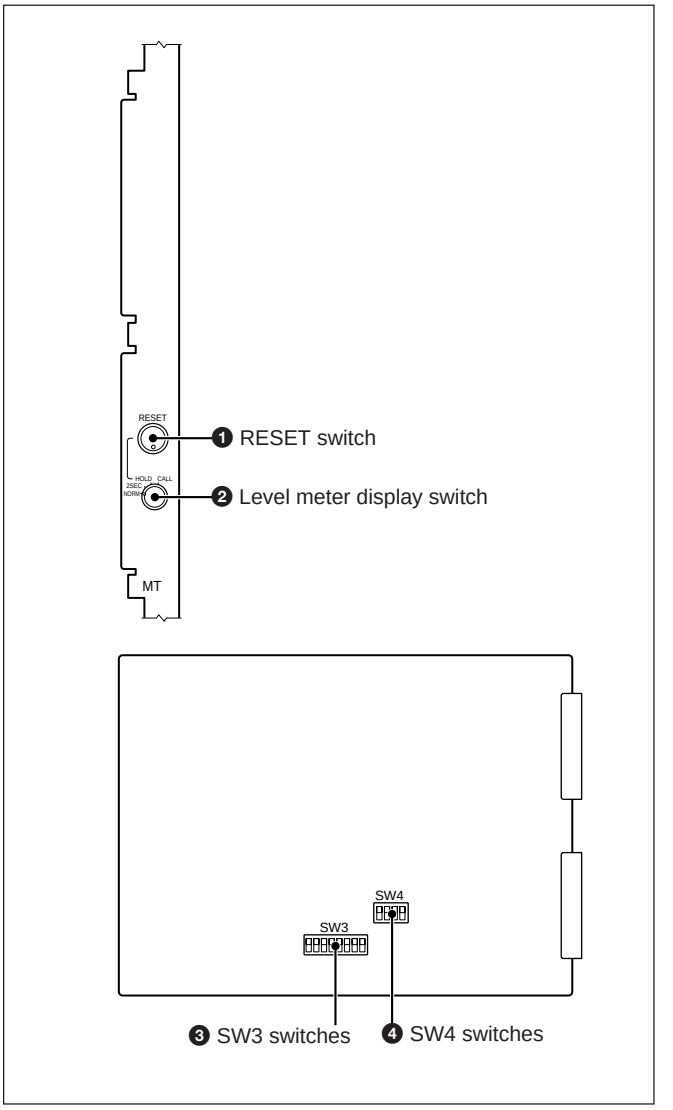
[illegible]

These switches determine the advance output of the digital audio signal.
The D-OUT NORM/ADV switch is for selecting advance output (ADV) or normal output (NORM). Normally all eight individual bit switches of the ADV OUT switches should be in the lower positions. This represents a value of 255 words, the maximum advance. Thus, the advance (in words) will be a sum of the values assigned to the switches set to the lower positions.
For a setting example, see "Setting the ADV OUT switches" (page 11-8).

[illegible] 4

These are for factory test purposes only. Do not change the settings.

MT board



MT board

[illegible] 1

When the level meter display switch is set to HOLD, pressing this switch resets the peak value being held.

[illegible] 2

This selects how the digital audio channel level meter display operates as follows:

NORM: Operates as a peak program meter.

2SEC: Operates as peak program meter, but also holds the peak value for approximately 2 seconds.

HOLD: Operates as a peak program meter, but also holds the peak value when the RESET switch is pressed.

CAL: Setting for calibrating A/D converter gain

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SW3

These switches determine the number of consecutive words for which the level of a digital audio track has to be out of range before the OVER lamp of the level meter lights. The value that can be set ranges from 1 to 8, and DIP switches No. 1 to No. 8 correspond to one to eight words. Thus to set a limit of four words, set switch No. 4 only to the upper position.

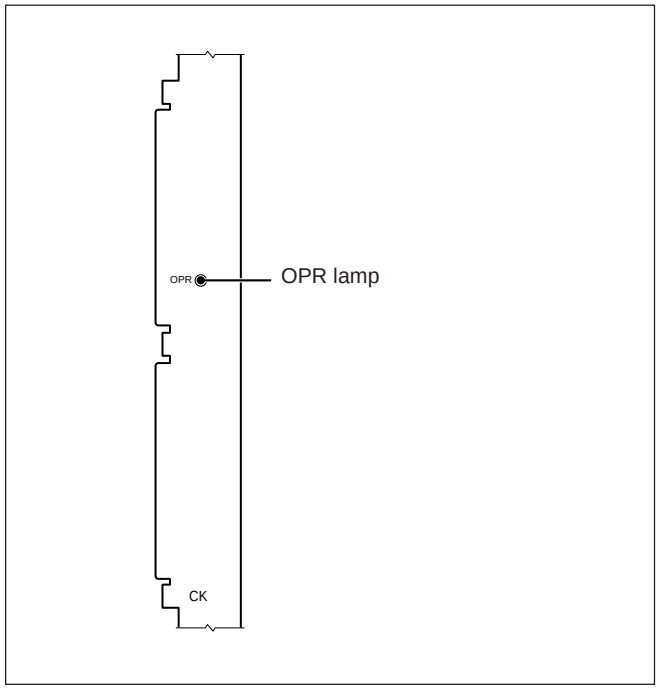
SW4

Switch No. 5 determines the mode for A/D converter gain calibration (when the level meter display switch is in the CAL position).

Lower (OFF) Each segment represents 0.2 dB centered on -20 dB.

Upper (FLASH) When the input level reaches at least 0.2 dB of a segment of the meter, that segment flashes.

CK board



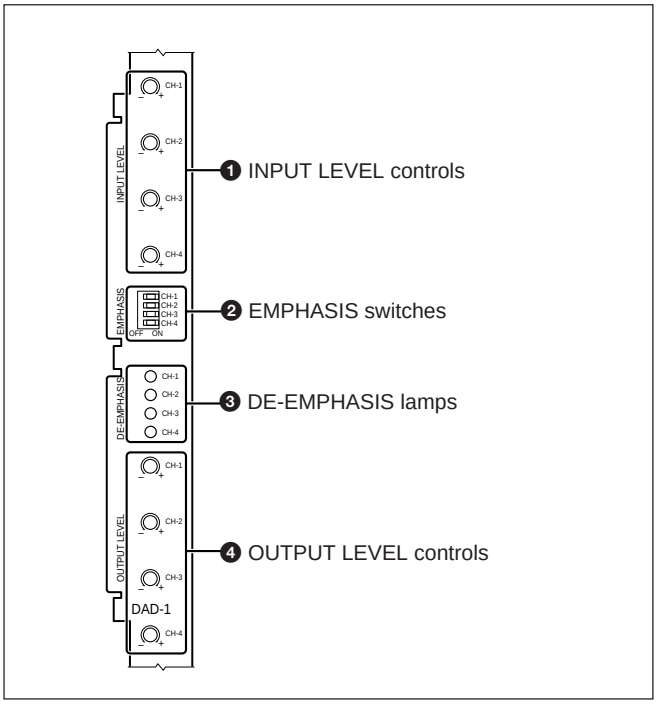
CK board

OPR (operation) lamp

Remains lit when the CK board is operating normally. Flashes when an external sync signal is input and the CK board is not synchronized with the signal.

DAD-1 to DAD-12 boards

These boards are available only when the optional DABK-3343HR is mounted.



DAD-1 to DAD-12 boards

INPUT LEVEL

These adjust the input levels of the analog signal for each digital audio channel.
For details, see "Adjusting the gain of the input signal" (page 2-2).

EMPHASIS

The emphasis circuits can be turned on and off individually for each channel with these switches when the EMPH switch in the system control block is set to INDIVI.

ON: The emphasis circuit of the corresponding channel is activated.

OFF: The emphasis circuit of the corresponding channel is not activated.

The switches are set to OFF at the factory.

When the EMPH switch in the system control block is set to ON, the emphasis circuits for all the channels on the DAD board are activated, regardless of the settings of these EMPHASIS switches on the board.
When the EMPH switch is set to OFF, the emphasis circuits for all the channels on the DAD board are not activated, regardless of these EMPHASIS switches.

When the EMPH switch is set to AUTO, the emphasis circuits are turned on and off according to the emphasis ON/OFF information recorded on the tape.

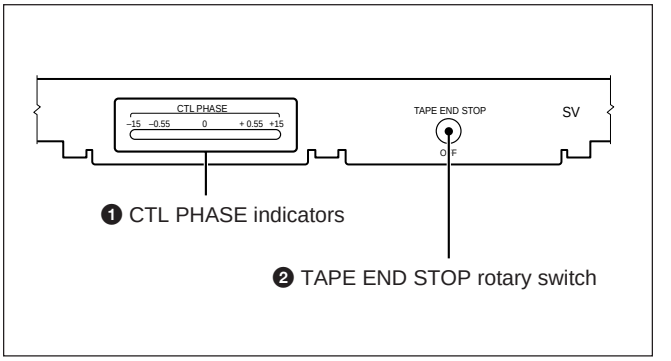
DE-EMPHASIS lamps

These lamps light when de-emphasis is being carried out on the corresponding digital audio channel. De-emphasis is automatically switched on and off depending on the emphasis information in the digital audio signal input to this board.

OUTPUT LEVEL

These adjust the output levels of the analog signal for each digital audio channel.
For details, see "Adjusting the gain of the output signal" (page 2-2).

SV board



SV board

CTL PHASE indicators

Lights up to show the phase of the reproduced CTL locked to the master clock.

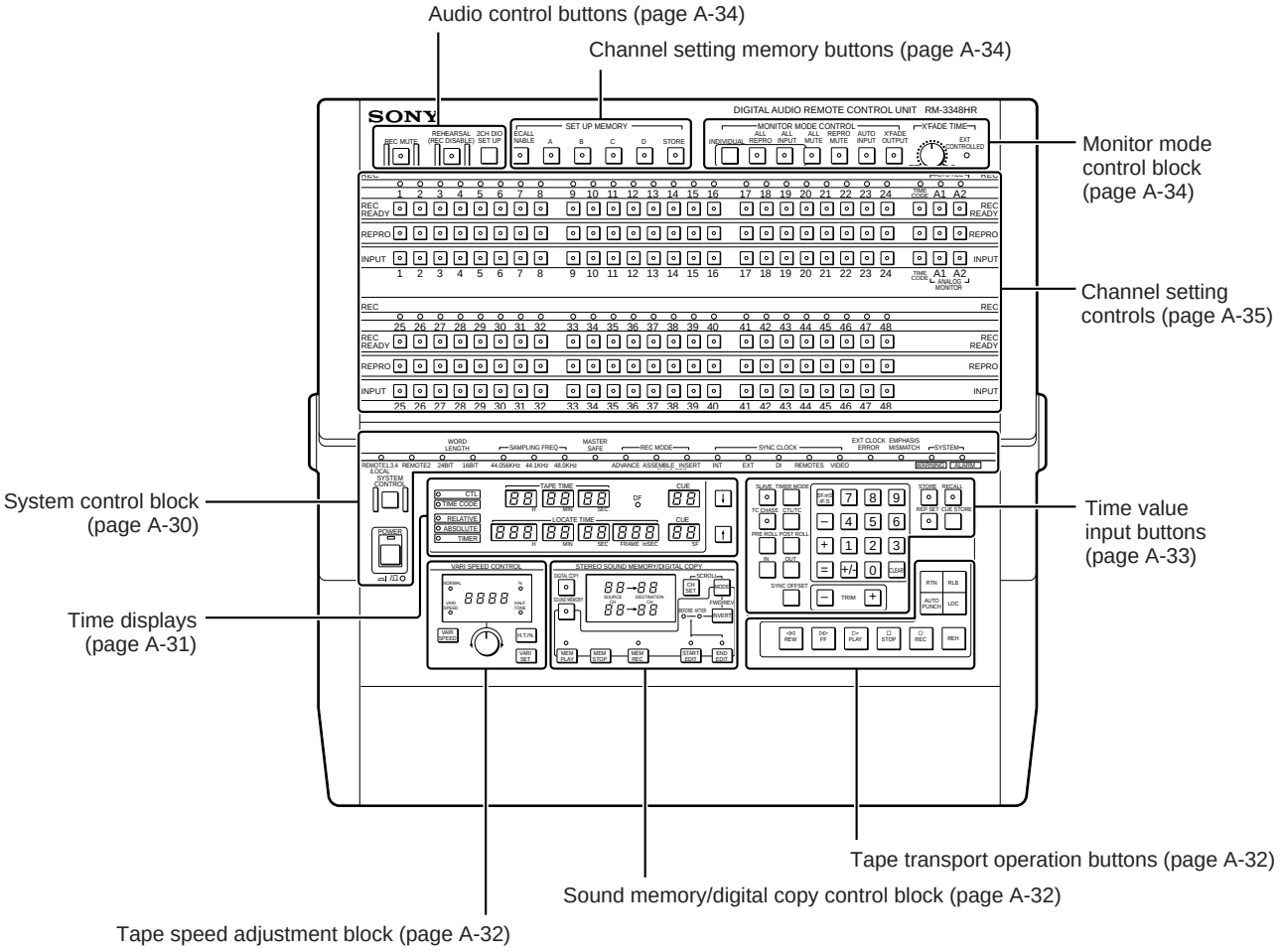
TAPE END STOP rotary switch

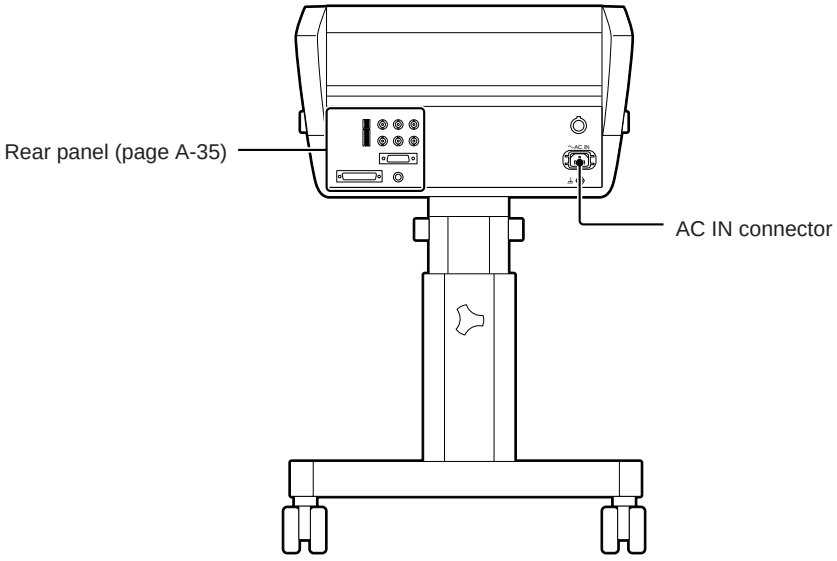
Determines the point where the tape starts to slow down at the tape end.

- When this switch is set to "0," the tape end slowdown function does not work
- When this switch is set to an even value, the tape slows down at the tape end and is then rewound.
- When this switch is set to an odd value, the tape slows down at the tape end and then stops.
- The larger value the switch setting is, the tape starts to slow down with the more remaining.

The switch is set to "7" at the factory.

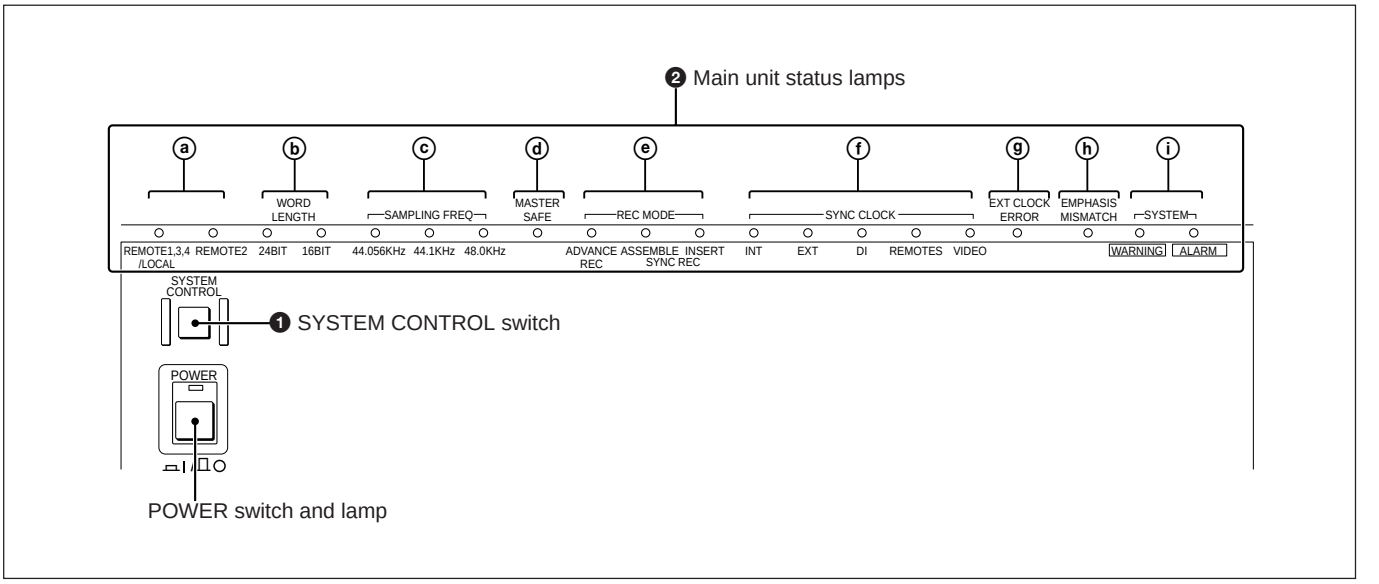
RM-3348HR


Audio control buttons (page A-34)
Channel setting memory buttons (page A-34)
Monitor mode control block (page A-34)
Channel setting controls (page A-35)
System control block (page A-30)
Time value input buttons (page A-33)
Time displays (page A-31)
Tape transport operation buttons (page A-32)
Sound memory/digital copy control block (page A-32)
Tape speed adjustment block (page A-32)
DIGITAL AUDIO REMOTE CONTROL UNIT RM-3348HR



RM-3348HR

System control block



System control block

SYSTEM CONTROL switch

This has the same effect as the SYSTEM CONTROL switch on the PCM-3348HR.

For details, see "System control block" (page A-4) in the section "PCM-3348HR."

Main unit status lamps

These indicate the operating state of the PCM-3348HR.

REMOTE1,3,4/LOCAL, REMOTE2 lamps

These indicate which devices are able to control the PCM-3348HR.

REMOTE1,3,4/LOCAL: PCM-3348HR, RM-3348HR, devices connected to the REMOTE-1, the EXT SPEED CONTROL INPUT connector or the EXT PHASE CONTROL INPUT connector, devices connected to the AUX connector or the REC RDY CONTROL 1/2 connectors, or video editor connected to the REMOTE-2 connector.

REMOTE2: video editor connected to the REMOTE-2 connector.

WORD LENGTH lamps

These indicate the number of bits for the word length.

SAMPLING FREQ lamps

These indicate the sampling frequency.

44.056KHz 44.056kHz

44.1KHz 44.1kHz

44.1KHz lamp Fs (sampling frequency) shift mode, 0.1% reduction from 44.1 kHz

48.0KHz 48.0kHz

48.0KHz lamp Fs shift mode, 0.1% reduction from 48.0 kHz

MASTER SAFE lamp

Remains lit when all channels are in the recording inhibited state (master safe).

REC MODE lamps

These indicate the currently selected recording mode.

ADVANCE REC Advance recording mode

ASSEMBLE Assemble recording mode

INSERT Insert recording mode

[illegible]

These indicate which reference signal is being used for synchronization.

INT: Internal master clock

EXT: Signal input via the WORD SYNC INPUT connector on the PCM-3348HR rear panel

DI: Signal input via the AES/EBU D-I connector on the rear panel of the PCM-3348HR

REMOTE: signal input via the RM-3348HR

VIDEO: composite video signal input via the REFERENCE VIDEO INPUT connector on the rear panel of the PCM-3348HR.

[illegible]

When the PCM-3348HR SYNC CLOCK switch is set other than to INT, this lights in the following cases:

- When the selected reference signal is not input.
- When the selected reference signal is input, but synchronization is not possible.

In these cases, the SYNC CLOCK lamp corresponding to the selected reference signal flashes.

[illegible]

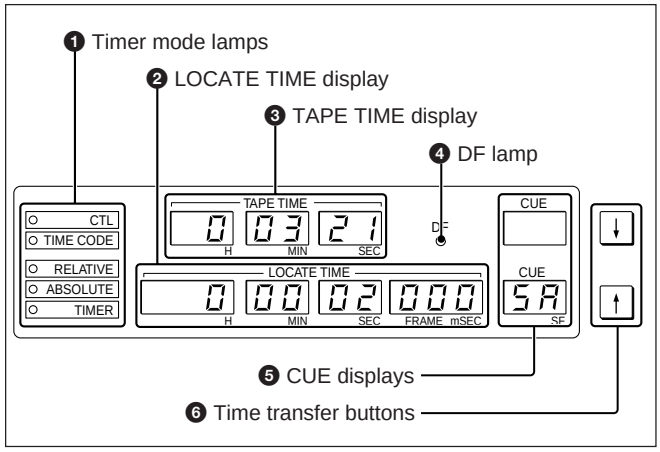
This lights when the emphasis information recorded on a tape does not agree with the EMPH switch setting on the PCM-3348HR.

[illegible]

WARNING: This lamp lights when there are particular combinations of settings on the PCM-3348HR.
For details, see Section 12-2-5, "If the SYSTEM WARNING Lamp Lights" (page 12-6).

ALARM: This lamp lights when there is a fault in the PCM-3348HR.
For details, see Section 12-2-6, "If the SYSTEM ALARM Lamp Lights" (page 12-6).

Time displays



Time displays

[illegible] 1

These indicate the type of time values being shown on the TAPE TIME display and LOCATE TIME display.

CTL: CTL address

TIMECODE: Time code

RELATIME: CTL relative value

ABSOLUTE: CTL or time code absolute value

TIMER: Timer roller counter value

[illegible]

This shows a time value saved in a register or input with the numeric buttons. It also displays warning indications.

[illegible]

Depending on the setting of the timer display mode, this shows the tape transport time, the CTL address or time code value recorded on the tape, the time code value produced by the time code generator, or the timer roller counter value.

[illegible] 4

This lights when the drop frame mode si selected for the time code.

[illegible] 5

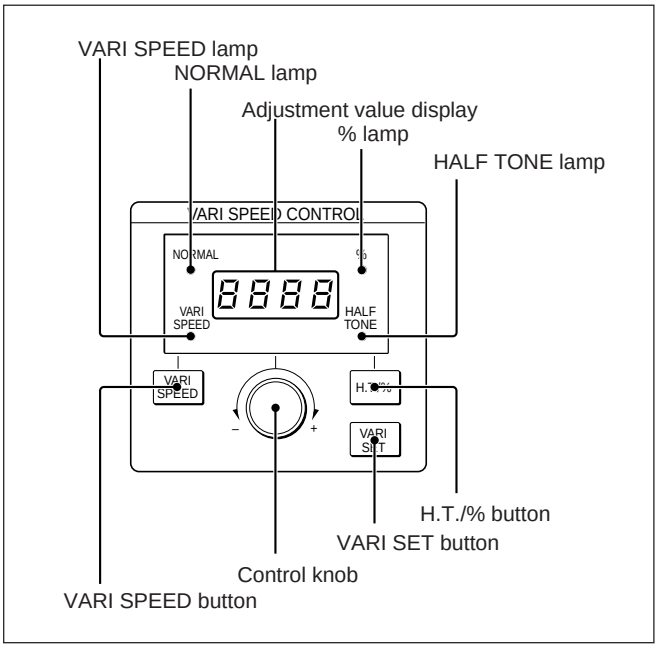
These show the registers used for storing or retrieving cue points.

[illegible] 6

↓: Transfers the value from the TAPE TIME display to the LOCATE TIME display.

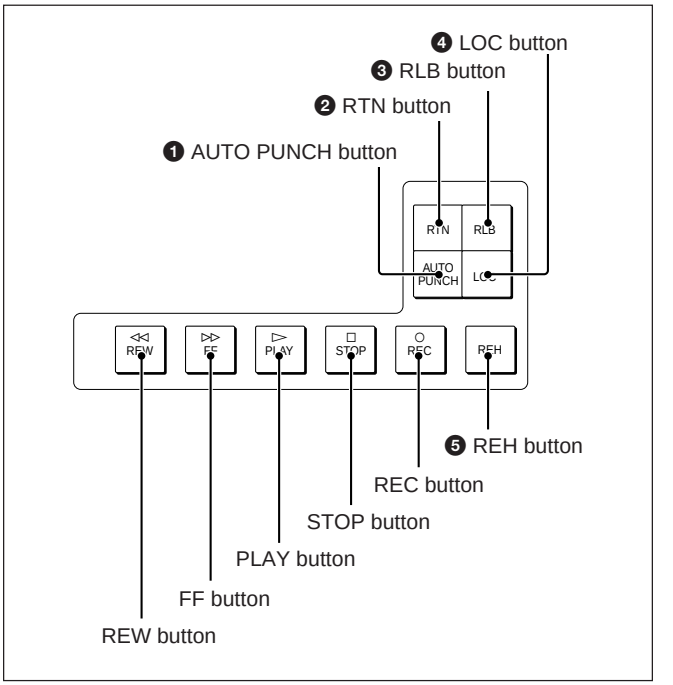
↑: transfers the value from the LOCATE TIME display to the TAPE TIME display.

Tape speed adjustment block



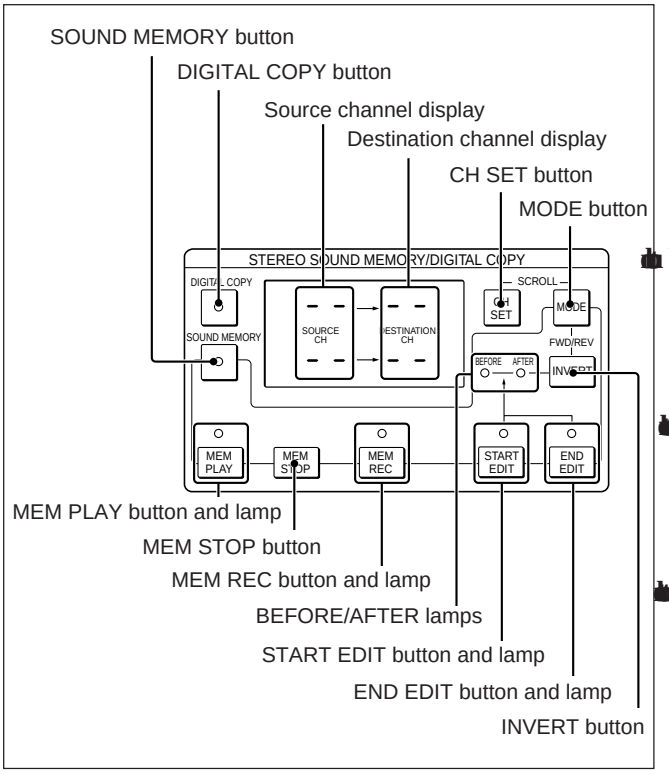
For details on the effect of these controls, see Section 4-7, "Adjusting the Tape Speed" (page 4-27).

Tape transport operation buttons



Tape transport operation buttons

Sound memory/digital copy control block



For details on the effect of these controls, see Chapter 5, "Time Shift Editing Using the Sound Memory Function" and Chapter 6, "Digital Copy Function."

❶

Press this button when using auto punch in/out.
For details, see Section 4-4, "Auto Punch In/Out" (page 4-14).

❷

Press this button when using return playback.
For details, see Section 4-3-3, "Return Playback and Repeat Playback" (page 4-13).

❸

Press this button when using the roll-back function.
For details, see Section 4-3-2, "Roll-Back Operation" (page 4-12).

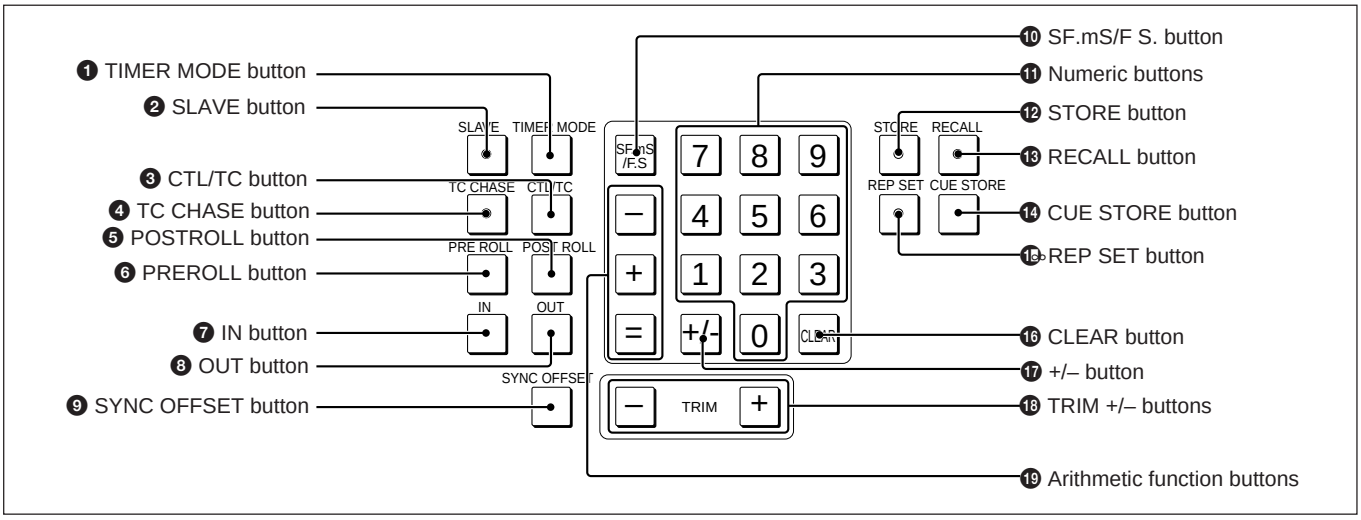
❹

Press this button when performing a locate operation.
For details, see Section 4-3-1, "Locate Operation" (page 4-11).

❺

Press this button to conduct a rehearsal from the punch-in point to the punch-out point.
For details, see Section 4-4, "Auto Punch In/Out" (page 4-14).

Time value input buttons



Time value input buttons

T 1 R E

Use this button to change the timer display mode.
For details, see Section 2-5-2, "Setting the Timer Display Mode" (page 2-15).

S E

When using this unit as a slave unit, press this button for operation synchronized to the operation of other equipment.
For details, see Chapter 7, "Synchronized Operation."

3

Use this button to change the timer display mode.
For details, see Section 2-5-2, "Setting the Timer Display Mode" (page 2-15).

4

Press this button to carry out a time code chase operation.
For details, see Section 7-2-7, "Time Code Chase Operation" (page 7-10).

L

Use this button to store or recall a postroll time.

L

Use this button to store or recall a preroll time.

7

Use this button to store or recall a punch-in point or editing-in point.

8

Use this button to store or recall a punch-out point or editing-out point.

S T

Use this button to store or recall a sync offset time.

10

1D

For details of the operation of these buttons, see Section 4-6-2, "LOCATE TIME Display" (page 4-23).

E

Use this button to store a time value in memory.

L

Use this button to recall a time value stored in memory.

E

Use this button for storing cue point register time values.

15

Press this button to set the start point or end point for return playback or repeat playback.
For details see Section 4-3-3, "Return Playback and Repeat Playback" (page 4-13).

R

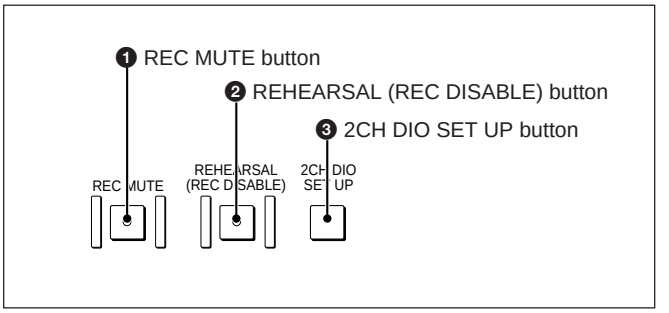
17

M

19

For details on the operation of these buttons, see Section 4-6-2, "LOCATE TIME Display" (page 4-23).

Audio control buttons



Audio control buttons

M 1

Use this button to record a muting signal.
For details, see Section 4-1-2, "Recording Muting Signals on All Digital Audio Channels" (page 4-3).

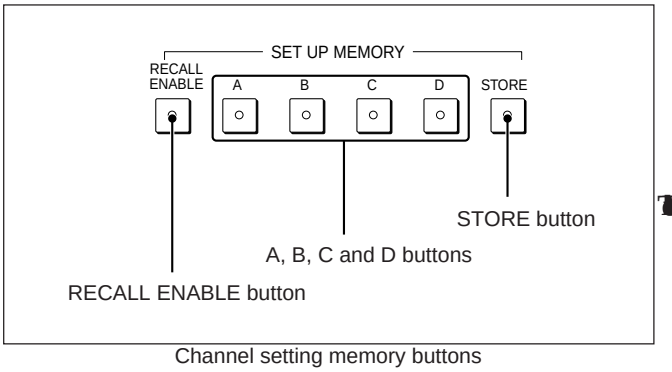
(REHEARSAL)

Pressing and lighting this button disables recording, so that pressing the REC button and PLAY button simultaneously will not initiate any actual recording. When this button is lit, pressing PLAY while holding down REC has the same effect as pressing PLAY while holding down REH.

3

Use this button to select the input/output channels to be connected to the AES/EBU D-I/D-O connectors and SDIF-2 (unbalanced) INPUT/OUTPUT connectors.
For details, see Section 2-4-7, "Setting the Input/Output Channels for Two Channels of Digital Audio Signals" (page 2-12).

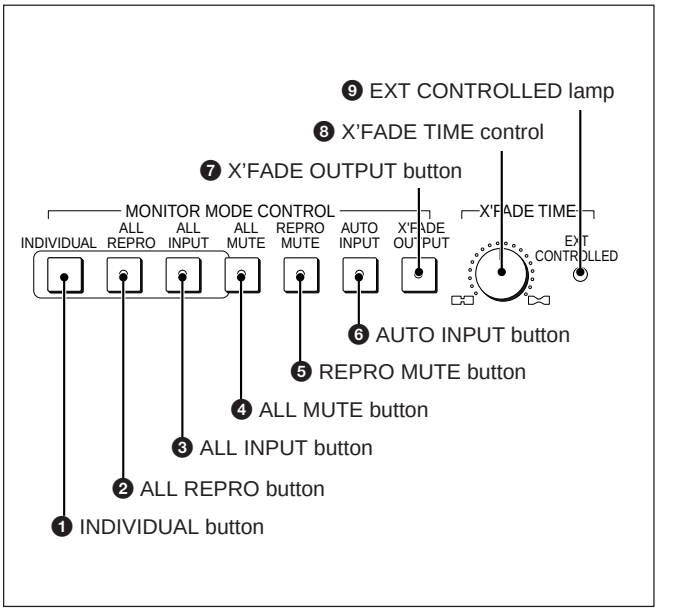
Channel setting memory buttons



Channel setting memory buttons

For details on the effect of these buttons, see Section 4-1-5, "Channel Setting Memory" (page 4-8).

Monitor mode control buttons



Monitor mode control block

L
D
T

For details on the operation of these buttons, see Section 4-1-3, "Switching the Monitor Output" (page 4-4).

E
E

For details on the operation of these buttons, see Section 4-1-4, "Muting the Monitor Signal" (page 4-7).

T

For details on the operation of this button, see Section 4-1-3, "Switching the Monitor Output" (page 4-4).

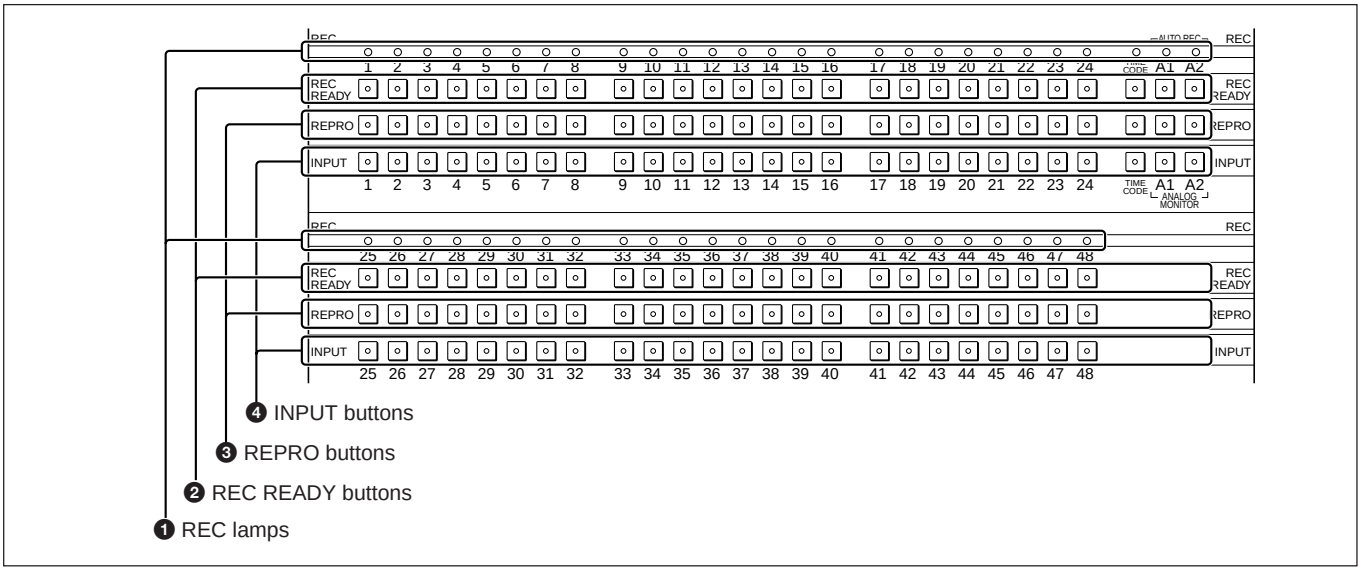
E

This button determines whether the monitor signal is a direct reproduction of the cross fade as recorded or whether it is an undelayed input signal.
For details, see "Monitoring the cross fade sound during sync recording" (page 4-10).

E
P

For details on the operation of the control and lamp, see Section 4-2, "Setting the Cross Fade Time" (page 4-9).

Channel setting controls



Channel setting controls

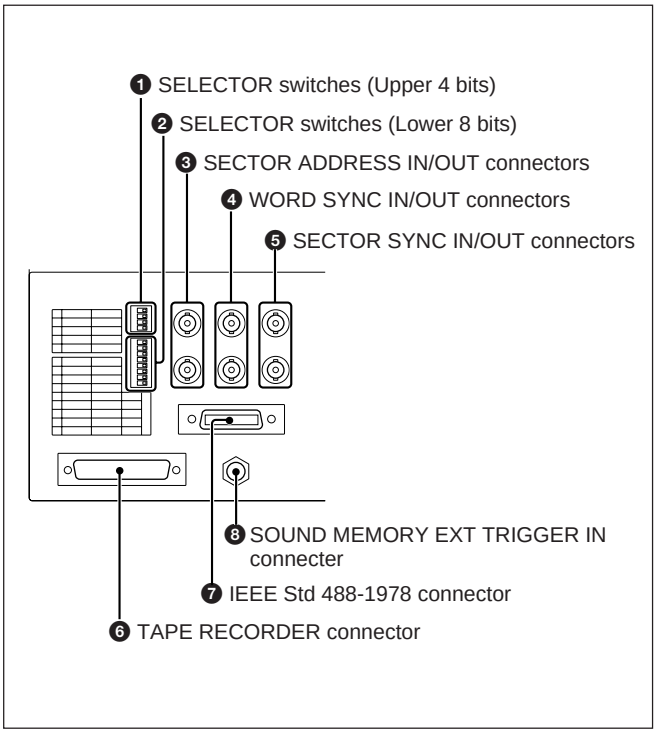
1
2

For details on the operation of these buttons and lamps, see Section 4-1-1, "REC READY Buttons and REC Lamps" (page 4-1).

3
4

For details on the operation of these buttons, see Section 4-1-3, "Switching the Monitor Output" (page 4-4).

Rear panel


1 SELECTOR switches (Upper 4 bits)
2 SELECTOR switches (Lower 8 bits)
3 SECTOR ADDRESS IN/OUT connectors
4 WORD SYNC IN/OUT connectors
5 SECTOR SYNC IN/OUT connectors
8 SOUND MEMORY EXT TRIGGER IN connecter
7 IEEE Std 488-1978 connector
6 TAPE RECORDER connector

Rear panel

DIP switches

These DIP switches select various aspects of the PCM-3348HR operating mode.
Each individual switch is factory set to the On position.

No.1 Unused

No.2
ON: Preroll auto punch in/out mode (NORM)
OFF: Direct auto punch in/out mode (A.PUNCH)
See Section 4-4, "Auto Punch In/Out" (page 4-14).

No.3
ON: RM-3348HR REC READY buttons enabled (NORM)
OFF: RM-3348HR REC READY buttons disabled (REC RDY)
See "Inhibiting channel punch in/out" (page 4-3).

No.4
ON: RM-3348HR memory backup function disabled (NORM)
OFF: RM-3348HR memory backup function enabled (BACK UP)
See Section 2-6-2, "Activating the Memory Backup Function" (page 2-18).

[illegible]

These DIP switches select various aspects of the PCM-3348HR operating mode.
Each individual switch is factory set to the on position.

No.1

ON: Normal mode (NORM)
OFF: Test mode (TEST)
Always keep this switch in the NORM position.

No.2

ON: Connected PCM-3348HR is the master unit. (MASTER)
OFF: Connected PCM-3348HR is a slave unit. (SLAVE)
See Section 7-1-1, "Connections and Preparations for Synchronized Operation" (page 7-1).

No.3

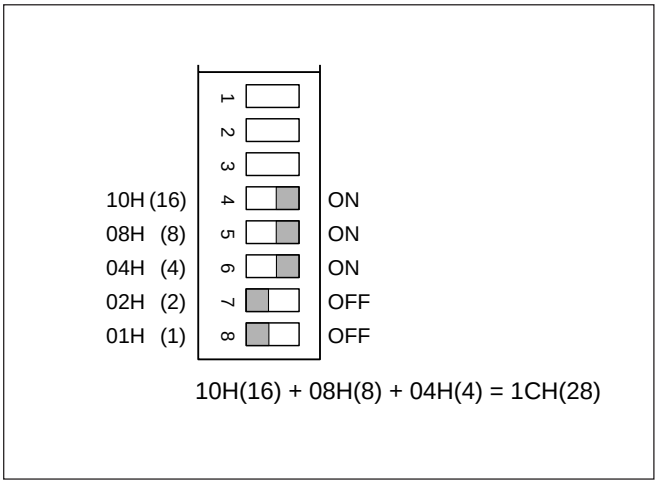
ON: Maximum 10 cue point registers (10 CUE)
OFF: Maximum 100 cue point registers (100 CUE)
See Section 4-6-4, "Selecting the Number of Cue Point Registers" (page 4-25).

No.4 to No.8

Set the IEEE 488 device address for sector-based synchronization.

[illegible]

To use sector-based synchronization, each RM-3348HR must have a unique device address. Switches No. 4 to 8 encode this address in binary; switch No.4 is the most significant bit (value 16), and each switch represents a binary 1 in the ON position.



[illegible]

For details on these connectors, see "Connectors used for synchronization signals" (page 10-3).

[illegible]

Connect to the PCM-3348HR using the supplied cable.

[illegible]

For synchronized operation, connect to other remote control units (RM-3324, RM-3348 or RM-3348HR) using an SMK-0032 cable (optional).

[illegible]

SH1, AH1, T2, L2, SR1, RL1, PP0, DC0, DT0, C1, C2, C3, C28 and E1 (IEEE 488-1978)

[illegible]

Input the sound memory external trigger signal.
For details, see Section 5-6-3, "Inputting a Trigger Signal to the RM-3348HR" (page 5-13).

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Specifications

PCM-3348HR

General

Dimensions	916 × 997 × 740 mm ($36^1/_8 \times 39^3/_8 \times 19^1/_4$ inches) (w/h/d) (excluding projections)
Mass	About 220 kg (485 lb)
Power requirements	
Model available in U.S.A. and Canada:	120 V AC, 60 Hz
Model available in other countries:	220 to 240 V AC, 50/60 Hz
Power or current consumption	
Model available in U.S.A. and Canada:	1.2 kW
Model available in other countries:	7 A
Operating temperature	For specified performance: 10°C to 35°C (50°F to 95°F) For operation: 5°C to 40°C (41°F to 104°F)
Operating humidity	For specified performance: 30% to 70% For operation: 20% to 90%
Storage temperature	–20°C to +55°C (–4°F to +131°F)
Storage humidity	20% to 75%

Format

Recording format	DASH-PLUS/DASH-F
Channel coding method	HDM-1
Number of digital audio channels	48
Quantization	24-bit linear/16-bit linear (switchable)
Error correction	Cross interleave
Recording time	(Using a 14-inch reel)
24 bits:	40 minutes (Fs=48.0 kHz) 44 minutes (Fs=44.1 or 44.056 kHz)
16 bits:	60 minutes (Fs=48.0 kHz) 65 minutes (Fs=44.1 or 44.056 kHz)
Tape speed	
24 bits:	114.3 cm/s (Fs=48 kHz) 105.02 cm/s (Fs=44.1 kHz) 104.92 cm/s (Fs=44.065 kHz)
16 bits:	76.2 cm/s (Fs=48.0 kHz) 70.01 cm/s (Fs=44.1 kHz) 69.94 cm/s (Fs=44.056 kHz)
Tape speed variation range	±12.5%
Tape used	10-inch, 12.5-inch, 14-inch
Heads	Recording × 1 Playback × 2 Erase × 1
Recording tracks	Digital audio tracks 1 to 48 Analog audio tracks A1 and A2 Time code and CTL, 1 track each

Digital audio channel characteristics

Frequency response	20 Hz to 21.7 kHz $^{+0.5}_{-1.0}$ dB
Dynamic range	105 dB TYP (1 kHz, emphasis OFF)
Total harmonic distortion	0.009% TYP maximum (20 Hz to 20 kHz, reference level)
Cross talk between channels	–100 dB TYP minimum (20 Hz to 20 kHz)
Emphasis time constant	50 µs/15 µs (CD type)
Level displays	16-segment LED, peak level
Sampling frequency	44.056 kHz, 44.1 kHz, 48.0 kHz ±12.5% When recording: switchable During playback: switched automatically
Signal processing system delay time	Playback delay time: 264 blocks (66 ms at Fs=48 kHz) Recording delay time: 240 blocks (60 ms at Fs=48 kHz)

Analog audio channel characteristics

Frequency response 50 Hz to 10 kHz $^{+2}_{-6}$ dB
Signal-to-noise ratio 60 dB minimum (1 kHz, reference level input)
Total harmonic distortion
3% maximum (1 kHz, reference level input)
Level displays 8-segment LED, peak level
Carrier frequency 2 × sampling frequency
Emphasis time constant
150 µs/50 µs

Servo system characteristics

[illegible]
Lock-in time 0.5 sec. maximum when starting

[illegible]
Wow and flutter 0.1% maximum (RMS UNWTD)
Maximum fast forward/rewind speed
16 m/s
Slow wind speed 1.52 m/s
Shuttle variable speed range
0.076 m/s to 3.8 m/s (forward and reverse)
External phase control sensitivity
5% of playback speed/V
External speed control sensitivity
160 cm/s/V

[illegible]
Maximum rotation rate
1400 r/min (1400 rpm)
Winding time 4 min. 20 sec. (14-inch reel)
2 min. 25 sec. (10.5-inch reel)
Timer roller tolerance
±3.6 sec. (14-inch reel)

[illegible]
Locate accuracy
Using timer roller: ±3.6 sec. (running a D-1/2-2920 from beginning to end)
Using CTL address:
0 to +32 ms (Fs=48 kHz)

Other characteristics

Editing resolution 1 sector
1.09 ms (Fs=44.056 kHz)
1.088 ms (Fs=44.1 kHz)
1.00 ms (Fs=48 kHz)
Maximum cable lengths (Digital I/O)
SDIF-2 (balanced):
75 m (246 feet) maximum
SDIF-2 (unbalanced):
75 m (246 feet) maximum
AES/EBU: 100 m (328 feet) maximum
MADI: 50 m (164 feet) maximum
REMOTE 1: 20 m (66 feet) maximum
REMOTE 2: 75 m (246 feet) maximum
REMOTE 3: 120 m (394 feet) maximum
REMOTE 4: 20 m (66 feet) maximum
WORD SYNC: 75 m (246 feet) maximum
SECTOR SYNC: 75 m (246 feet) maximum
SECTOR ADDRESS:
75 m (246 feet) maximum
METER: 120 m (394 feet) maximum

Input connectors

DIGITAL AUDIO CHANNEL LINE INPUT
Number of channels
48
Rated input +4 dBs
Maximum input +24 dBs
Gain +10 dB to 0 dB variable
Impedance 10 kilohms minimum, balanced
Connector type (qt.) NK-27-31SL (6)
ANALOG A1, A2 INPUT
Number of channels
2
Rated input +4 dBs
Maximum input +19 dBs
Gain +10 dB to –2dB variable
Impedance 10 kilohms minimum, balanced
Connector type (qt.) XLR-3-31(2)
WORD SYNC INPUT
Levels 3 V minimum
Impedance 75 ohms, unbalanced (75 ohms on/off switchable)
Frequency 38.549 kHz to 54 kHz
Connector type (qt.) BNC type (2), loop-through output

SECTOR SYNC INPUT
- Levels: TTL levels
- Impedance: 75 ohms, unbalanced
- Frequency: 1 kHz ±50 ppm
- Connector type (qt.): BNC type (1)

REFERENCE VIDEO INPUT
- Levels: 0.3 V p-p (burst signal); 4 V p-p (composite sync signal)
- Impedance: 75 ohms, unbalanced (75 ohms on/off switchable)
- Frequency: 30 Hz/29.97 Hz/25 Hz/24 Hz ±50 ppm
- Connector type (qt.): BNC type (2), loop-through output

SECTOR ADDRESS INPUT
- Levels: TTL levels
- Impedance: 75 ohms, unbalanced
- Connector type (qt.): BNC type (1)

TIME CODE
- Levels: 0.5 to 10 V p-p
- Impedance: 10 kilohms minimum, balanced
- Connector type (qt.): XLR-3-31 (1)

EXT PHASE CONTROL
- Levels: ±10 V
- Impedance: 10 kilohms minimum, balanced
- Connector type (qt.): XLR-3-31 (1)

EXT SPEED CONTROL
- Levels: ±10 V
- Impedance: 10 kilohms minimum, balanced
- Connector type (qt.): XLR-3-31 (1)

Output connectors

DIGITAL AUDIO CHANNEL LINE OUTPUT
- Number of channels: 48
- Rated output: +4 dBs, load impedance at least 100 k ohms
- Maximum output: +24 dBs, load impedance at least 100 k ohms
- Gain: 0 dB to –10 dB variable
- Impedance: 60 ohms maximum, balanced
- Connector type (qt.): NK-27-32SL (6)

ANALOG A1, A2 OUTPUT
- Number of channels: 2
- Rated output: +4 dBs, load impedance at least 100 k ohms
- Maximum output: +19 dBs, (at 1 kHz), load impedance at least 100 k ohms
- Gain: +2 dB to –10 dB variable
- Impedance: 60 ohms maximum, balanced
- Connector type (qt.): XLR-3-32 (2)

WORD SYNC OUTPUT
- Levels: TTL output equivalent
- Impedance: 75 ohms, unbalanced
- Connector type (qt.): BNC type (2)

SECTOR SYNC OUTPUT
- Levels: TTL output equivalent
- Impedance: 75 ohms, unbalanced
- Connector type (qt.): BNC type (1)

SECTOR ADDRESS OUTPUT
- Levels: TTL output equivalent
- Impedance: 75 ohms, unbalanced
- Connector type (qt.): BNC type (1)

TIME CODE
- Levels: 2.4 V p-p ±0.1 V
- Impedance: 100 ohms maximum, balanced
- Connector type (qt.): XLR-3-32 (1)

Digital inputs

SDIF-2 (BALANCE) INPUT
- Connector type (qt.): D-SUB 50-pin, male (2)
- Number of channels: 48
- Electrical characteristics: RS-422A
- Format: SDIF-2 (balanced)
- Impedance: RS-422A, balanced
- Transfer rate: 1.536 Mbits/s (Fs=48.0 kHz)

AES/EBU D-I
- Connector type (qt.): XLR-3-31 (4)
- Number of channels: 8
- Electrical characteristics: RS-422A
- Format: AES/EBU
- Impedance: RS-422A, balanced
- Transfer rate: 3.072 Mbits/s (Fs=48.0 kHz)

SDIF-2 INPUT A/B [1)]
- Connector type (qt.) BNC type (2)
- Number of channels 2
- Electrical characteristics TTL
- Format SDIF-2 (unbalanced)
- Impedance 75 ohms, unbalanced
- Transfer rate 1.536 Mbits/s (Fs=48.0 kHz)

MADI
- Connector type (qt.) BNC type (1)
- Number of channels 48
- Electrical characteristics ECL
- Format MADI (unbalanced)
- Impedance 75 ohms, unbalanced
- Transfer rate 125 Mbits/s (Fs=48.0 kHz)

Digital outputs

SDIF-2 (BALANCE) OUTPUT
- Connector type (qt.) D-sub 50-pin, female (2)
- Number of channels 48
- Electrical characteristics RS-422A
- Format SDIF-2 (balanced)
- Impedance RS-422A, balanced
- Transfer rate 1.536 Mbits/s (Fs=48.0 kHz)

AES/EBU D-O
- Connector type (qt.) XLR-3-32 (1)
- Number of channels 8
- Electrical characteristics RS-422A
- Format AES/EBU
- Impedance RS-422A, balanced
- Transfer rate 3.072 Mbits/s (Fs=48.0 kHz)

SDIF-2 OUTPUT A/B
- Connector type (qt.) BNC type (2)
- Number of channels 2
- Electrical characteristics TTL
- Format SDIF-2 (unbalanced)
- Impedance 75 ohms, unbalanced
- Transfer rate 1.536 Mbits/s (Fs=48.0 kHz)

MADI
- Connector type (qt.) BNC type (1)
- Number of channels 48
- Electrical characteristics ECL
- Format MADI (unbalanced)
- Impedance 75 ohms, unbalanced
- Transfer rate 125 Mbits/s (Fs=48.0 kHz)

Remote control signal inputs and outputs

REMOTE-1
- Connector type (qt.) D-sub 37-pin, female (1)
- Format SRIF-1

REMOTE-2
- Connector type (qt.) D-sub 9-pin, female (1)
- Format Sony 9-pin remote format
- Electrical characteristics RS-422A

REMOTE-3
- Connector type (qt.) D-sub 50-pin, female (1)
- Format SRIF-3
- Electrical characteristics RS-422A

AUX
- Connector type (qt.) D-sub 25-pin, male (1)
- Format SRIF-4
- Electrical characteristics

REC RDY CONTROL
- Connector type (qt.) D-sub 50-pin, male (4)
- Format SRIF-4

Design and specifications are subject to change without notice.

1) With the supplied SDIF-2 (UNBALANCE) board fitted

RM-3348HR

General

Dimensions	472 × 399 × 187 mm (w/h/d) (18 5/8 × 15 3/4 × 7 3/8 inches)
Mass	
Main unit:	13.5 kg (29 lb 12 oz)
Stand:	14.5 kg (31 lb 15 oz)
Power supply	100 to 240 V AC, 50/60 Hz
Current consumption	0.7 A (at peak)
Operating temperature	For specified performance: 10°C to 35°C (50°F to 95°F) For operation: 5°C to 40°C (41°F to 104°F)
Operating humidity	For specified performance: 30% to 70% For operation: 20% to 90%
Storage temperature	–20°C to +55°C (–4°F to +131°F)
Storage humidity	20% to 75%

Functions

Cue point registers	Maximum 100
Cue point register numbers	0 to 99
Preroll time	0 to 1 hours
Default:	8 sec. (when Fs=48.0 kHz) 8.707 sec. (when Fs=44.1 kHz) 8.716 sec. (when Fs=44.056 kHz)
Postroll time	0 to 1 hours
Default:	3 sec. (when Fs=48.0 kHz) 3.265 sec. (when Fs=44.1 kHz) 3.269 sec. (when Fs=44.056 kHz)
Repeat points	Any two points from the cue point registers
Channel setting memory	Four selections from the 48 digital audio channels
Synchronized operation	Maximum of three units can be used.
Phase synchronization and editing resolution	1 sector 1.00 ms (Fs=48.0 kHz) 1.088 ms (Fs=44.1 kHz) 1.090 ms (Fs=44.056 kHz)
Editing accuracy	$^{+1}_{-0}$ sectors
TAPE TIME display	
CTL absolute mode	0 to 74 hr. 33 min. 55 sec. (Fs=48.0 kHz) 0 to 81 hr. 09 min. 34 sec. (Fs=44.1 kHz) 0 to 81 hr. 14 min. 26 sec. (Fs=44.056 kHz)
CTL relative mode	±9 hr. 59 min. 59 sec.
Time code absolute mode	0 to 23 hr. 59 min. 59 sec.
Timer roller counter mode	±9 hr. 59 min. 59 sec.
LOCATE TIME display (with second/millisecond switching function)	
CTL absolute mode	0 to 74 hr. 33 min. 55.455 sec. (Fs=48.0 kHz) 0 to 81 hr. 09 min. 34.645 sec. (Fs=44.1 kHz) 0 to 81 hr. 14 min. 26.820 sec. (Fs=44.056 kHz)
CTL relative mode	±9 hr. 59 min. 59.999 sec.
Time code absolute mode	NTSC: 0 to 23 hr. 59 min. 59 sec. 29 frames PAL: 0 to 23 hr. 59 min. 59 sec. 24 frames Film: 0 to 23 hr. 59 min. 59 sec. 23 frames
Timer roller counter mode	±9 hr. 59 min. 59.999 sec.
Variable speed range	±12.5% (percentage or semitone display)
Sound memory and digital copy indications	SOURCE CH, DESTINATION CH, MEM PLAY, MEM REC, START EDIT, END EDIT, BEFORE and AFTER lamps
Sound memory capacity	
Stereo signal	87.3 sec. (Fs=48.1 kHz) 95.1 sec. (Fs=44.1 kHz) 95.2 sec. (Fs=44.056 kHz)
Mono signal	174.6 sec. (Fs=48.0 kHz) 190.2 sec. (Fs=44.1 kHz) 190.4 sec. (Fs=44.056 kHz)

Sound memory editing accuracy
$^{+1}_{-0}$ sectors
Digital copy Two-channel mode: Maximum of two channels simultaneously
Multi-channel mode: Maximum of 48 channels simultaneously
Time code chase function
Chase modes: address mode, free mode
Phase synchronization accuracy:
$\pm 1/100$ frame
Variable offset range:
±23 hr. 59 min. 59 sec.
Offset error detection units:
$1/100$ frame
Sync offset time correction units:
$1/100$ frame
Cross fade time
For electronic editing (variable in 16 steps)
1.4 to 341.3 ms (Fs=48.0 kHz)
1.5 to 371.5 ms (Fs=44.1 kHz)
1.5 to 371.9 ms (Fs=44.056 kHz)
For splice editing (fixed)
5.2 ms (Fs=48.0 kHz)
5.6 ms (Fs=44.1 kHz)
5.7 ms (Fs=44.056 kHz)
Main unit status indications
SYSTEM CONTROL
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Word length
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SYNC CLOCK
EXT CLOCK ERROR
EMPHASIS MISMATCH
SYSTEM WARNING
SYSTEM ALARM

Channel selection functions
Individual selection and display of the PCM-3348HR digital audio channels, analog audio channels and time code channel:
REC, REC READY, REPRO and INPUT
Simultaneous switching for all digital audio channels:
AUTO INPUT, ALL MUTE, INDIVIDUAL, ALL REPRO, ALL INPUT, REPRO MUTE, REC MUTE and SET UP MEMORY
Digital I/O channels selectable

Input and output connectors

SECTOR SYNC, WORD SYNC, SECTOR ADDRESS
Levels TTL
Impedance 75 ohms
Connector type (qt.) BNC type (1 each)
SOUND MEMORY TRIGGER IN
Connector type (qt.) Phone jack (1)
TAPE RECORDER
Format SRIF-3
Electrical characteristics
RS-422A
Data transfer speed
250 k bytes/s
Connector type (qt.) D-sub 50-pin, male (1)
Maximum cable length
120 m (394 feet)
IEEE 488 bus
Standard IEEE 488-1978
Interface functions
SH1, AH1, T2, L2, SR1, RL1, PP0, DC0, DT0, C1, C2, C3, C4, C28 and E1
Maximum cable length
4 m (13 feet)

Design and specifications are subject to change without notice.

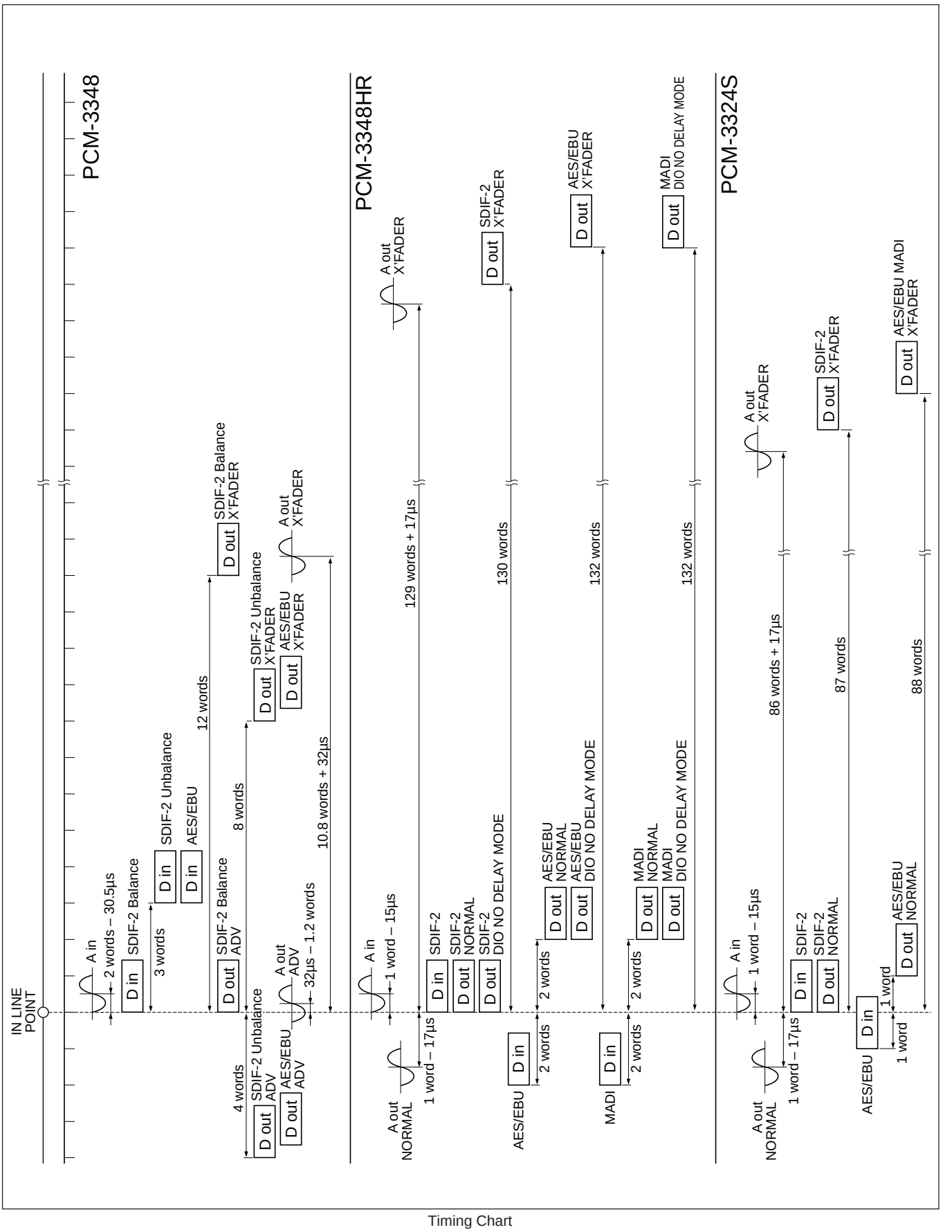
Accessories Supplied

Power cord (for PCM-3348HR) (1)
Power cord (for RM-3348HR) (1)
RH-10DA empty reel (10-inch) (1)
Stand (for RM-3348HR) (1)
Remote control cable (1)
Operation manual (1)
Installation manual (1)
Quick reference
Multi-connector plugs (27-pin, male) (6)
Multi-connector plugs (27-pin, female) (6)
SDIF-2 (UNBALANCE) board (1)
Extension board (1)
CL-1/2-12 tape cleaner (1)

Optional Accessories

DMU-3048 digital meter unit
DABK-3343HR converter board pack
D-1/2-1460 digital audio tape (10-inch)
D-1/2-2920 digital audio tape (14-inch)
RH-14DA empty reel (14-inch)
CL-1/2-12 tape cleaner

Timing Chart



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